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VETERINARY MEDICINE

JULY 1937

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No. 7

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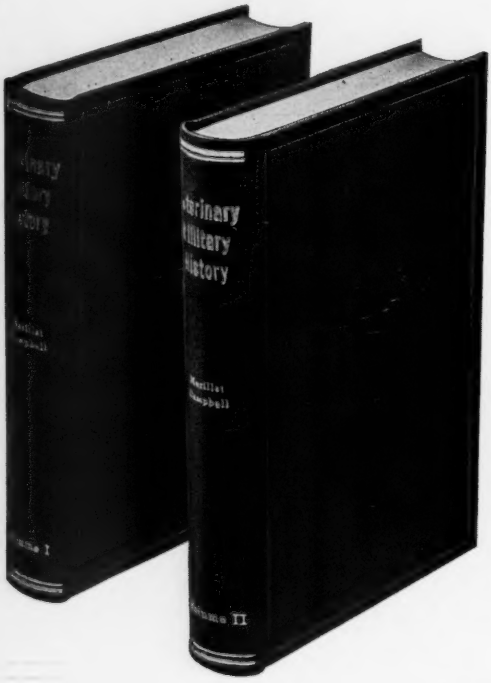

History impresses general truths on the mind by vivid representation of particular characters and incidents.

—*Macauley.*

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor
H. J. Mostyn, 1265 Broadway, New York, Eastern Representative

Rabies Situation Not Improving

It has been stated in these pages repeatedly that rabies in this country is a responsibility of dog owners and particularly of that part of the dog owning public interested in the breeding and showing dogs—the dog industry. It has been pointed out time and again that the veterinary profession possesses all the information necessary and the experience requisite to eradicate this distressing and costly disease whenever the dog industry wants it eradicated, or when an awakened general public shall force it to be done.

Evidence is not lacking that this public awakening is on the way. Take Illinois for example. The increasing menace of rabies is reflected in the following statistics from the health department.

Rabies in Illinois

Year	1932	1933	1934	1935	1936
Dog heads examined	894	979	1095	1608	2215
Positive for rabies	249	290	372	651	1009
Pasteur treatments supplied by state		1081	1459	2248	5476
Deaths of persons	4	7	6	5	9

Bad as this showing is, the figures constitute a great understatement of conditions, except as to the number of human deaths from rabies. The number of heads examined and positive cases include only those examined in the laboratories of the State Department of Health, the Chicago Health Department and at the University of Illinois; but do not include heads examined in private laboratories, and, of course, do not include the large number of cases diagnosed clinically by veterinarians in which no examination of the brain is deemed necessary.

The pasteur treatments enumerated include only those supplied free by the state. No account is taken of treatments purchased by patients and administered by family physicians.

In Illinois, owners of farm animals dying of rabies or otherwise injured by dogs, are entitled to an indemnity. Of recent years, claims allowed for such damage have approximated $200,000 annually.

The rabies situation in Chicago and in Illinois has been given much publicity in the newspapers. One result has been a dog quarantine in Cook County for almost a year. Another is a bill now pending before the state legislature providing: "Any dog in the hunting field during the period other than prescribed (the open season) is declared a public nuisance and may be killed by the owner or lessee of lands upon which said dog may be found." In a call to arms to defeat the measure, the *American Field* states: "Millions of dollars invested in sporting dogs in Illinois will be wiped out unless this measure is defeated."

One can sympathize with the sportsmen in their objection to this measure, but can scarcely excuse them for their indifference to the condition which has brought about a demand for it for the protection of the public. The dog industry has more to gain than any other group from the eradication of rabies. As before stated, information for the eradication of this disease and veterinarians possessing adequate skill for carrying out eradication measures are available. The dog industry has the option to free itself from the incubus of rabies in an orderly, inexpensive manner, or to have this boon bestowed upon it by the general public, perhaps in a somewhat ruthless manner, when it becomes sufficiently aroused.

No body of human beings is collectively and individually more earnestly and honestly concerned with the suppression of the infliction of suffering upon our dumb comrades than the veterinary profession, no matter how accidentally, how innocently, how ignorantly, or how intentionally, that suffering may be caused.—*The Veterinary Record.*

* * * *

The main object of clinical examination is to arrive at a correct diagnosis, without which reasonable prognosis or treatment is impossible. Diagnosis, however, is not the be-all or end-all, for if we cannot apply a suitable treatment for a disease, its correct diagnosis is of little value. I have repeatedly met with young men to whom diagnosis is a mania, yet when they are asked to prescribe an appropriate treatment, they are completely at a loss.—*J. McCunn,* in *The Veterinary Record.*

* * * *

Cattle hides and calf skins are the most important by-products of the meat packing industry. They are also significant factors in determining the prices of cattle on the livestock markets. The value of the hides of heavy steers averages 9% of the total value of the live animal. In cows and cheaper grades of beef, the value of the hide averages 15% of the live animal and in calves, 20%.

* * * *

Strathglass Jingle is the one-hundredth Ayrshire cow in the United States to produce more than 100,000 pounds of milk. As a three-year-old, she produced 7,702 pounds and it required only 28 days in her eleventh year to round out the fiftieth ton of milk. Her butterfat production is equally remarkable; 302 pounds as a three-year-old, 431 pounds in her second lactation period, 498 pounds in her third, 546 pounds in her fourth, 544 pounds in her fifth, 524 pounds in her sixth, 448 pounds in her seventh, and 377 pounds in her eighth lactation period. At her ninth calving, the most recent, Jingle dropped twins—heifers. She belongs to Al. Tryon, president of the Ayrshire Breeders' Association.

Finespun theories like gossamer threads are often very beautiful to behold, but for service they cannot be compared to the rope of clinical results.—*Phar. Adv.*

* * * *

Mammals in general, respond well (per rat unit) to either irradiated ergosterol or cod liver oil; birds in general do poorly with irradiated ergosterol, but respond well to cod liver oil.

* * * *

There is this to be said for "modernistic," pictorial and plastic art: The amateur worker in these fields needs no knowledge of drawing and no skill in modeling!—*Col. Louis B. Wilson.*

* * * *

Many medical writers unfamiliar with plain English, attempt to substitute therefor technical language, a procedure about as illogical as for a man on crutches to attempt to compete in a foot race.—*Col. Louis B. Wilson.*

* * * *

The voluminous literature of today marks geriatrics as an important study of the medical profession. The Fountain of Youth that Ponce de Leon sought along our southern coast and the perpetuation of youth that Metchnikoff sought in the intestines is now looked for in the gonads.—*Phar. Adv.*

* * * *

Prolific Stallions

Ludolf, a Friesan Coach stallion, was bred to 253 mares in 1918 and got 78% in foal. Allah, another stallion of the same breed, served 646 mares in six years, getting 77% in foal, and Sigmar, a third stallion of the same breed, was bred to 2,261 mares in a period of 13 years, getting 1530 foals. The Friesan Coach horse has been bred in East Friesland (Western Germany) for more than 200 years. It is described as: A 1500 to 1600 pound, broad, deep, round horse of the warm-blooded type, free moving with a sound foundation, a correct gait and a quiet temperament. Just about the ideal for which the American farmer is looking.

I pray that we, in the veterinary profession, may never relegate our duties as clinicians to the compilers of expert reports.—*J. McCunn,* in *The Veterinary Record.*

* * * *

Government scientists are trying to develop a kind of broom corn that will make good brooms and also yield seed palatable to livestock.—*S. N. L.,* 31:834.

* * * *

Cattle fed on a wheat diet need three additions to their menu for health—cod liver oil for vitamin A, salt for chlorine and bone meal to provide calcium.—*S. N. L.,* 31:834.

* * * *

In ancient Egypt and Babylonia, learned books were not valued so much for new ideas or knowledge they contained as for the old, time-tried lore they preserved.—*S. N. L.,* 31:834

* * * *

The chief trouble with the medical treatise, is that it is outmoded so soon after it leaves the press. Very few medical books retain clinical significance more than five years.—*Col. Louis B. Wilson.*

* * * *

In medical education, we are slowly relearning that a medical student's interest in anatomy and physiology for example, takes a keener start if the relationship of these sciences to the sick patient is emphasized early.—*Col. Louis B. Wilson.*

* * * *

Biliary Calculi

These concrements are relatively common in swine and cattle, but so far as we have been able to ascertain, they are rare in dogs or at least veterinarians have not reported them.

The absence of biliary calculi in dogs may be due to the fact that canine bile is acid in reaction. Human bile is alkaline and this reaction may be a reason for the frequent occurrence of biliary calculi. It has also been reported that guinea pig bile has an alkaline reaction and biliary calculi introduced into the gall bladder of a guinea pig will persist and increase in size.—*A. T. Kinsley.*

If it is agreed that the real function of the veterinary profession is to prevent animal disease and its spread to man, then it will be clear that in connection with poultry one of the best means of accomplishing this will be by suitable propaganda, lectures to poultry societies, talks at young farmers' clubs, the radio, and articles in the popular poultry press.

* * * *

Studies by the Zoological Division of the B.A.I. on swine lungworms show that the larvae localize for the most part in the calciferous glands of earthworms. Naturally infested earthworms were kept alive in the laboratory 6½ months; at the end of this period they still harbored live lungworm larvae. This indicates that once a lot or a pasture has become contaminated with lungworm eggs, the infestation may continue in earthworms for a relatively long time.

* * * *

The recent literature of drawing and painting is at present in a jangle. It possesses the excitements of an alley cat fight. —*Col. Louis B. Wilson.*

* * * *

Blind Homer sang of Helen—and "a drug to quiet all pain and strife and bring forgetfulness of every ill." Opium soothed the nerves of ancient Rome and eased the pain of the wounded Saracen. The sleeping-sponge was a ray of light in the dark ages when European medicine forsook Hippocrates and Galen for magic and mummery. Through forty centuries the opium dynasty ruled the realm of sedation unchallenged. Then, in rapid succession, came chloral hydrate, the bromides and finally the barbituric acid derivatives, culminating in Nembutal—a long step from the prescription calling for "fly specks scraped from a wall, tehu berry and the pod of a poppy." Clinically, Nembutal is one of the safest of the barbiturates. Administered orally, rectally or intravenously, it exerts rapid but brief hypnotic and a profound sedative effect from a dose only about one-half that required with certain other barbiturates.—*Clinical Medicine and Surgery.*

Developments of the A. V. M. A. in 39 Years

Col. Robt. J. Foster
President, A. V. M. A.

The Seventy-fourth annual meeting of the American Veterinary Medical Association, which will be held in Omaha August 17th to 20th, offers an opportunity to take note of the changes that have taken place in the association and in the veterinary profession in the 39 years that have elapsed since the only previous meeting of the national association in that city.

In 1898 the Omaha meeting was referred to as the first western meeting of the association, just as Cincinnati (1884), Chicago (1890) and Des Moines (1895) had, in turn, been referred to as the "First western meeting." The meeting this summer is not regarded as a western meeting. This is indicative of the extension of the association geographically in two score years.

A striking contrast between the meeting to be held next August and its predecessor in the same city, is afforded by the membership of the association. In 1898 the association had only 114 members whose dues were paid up and 142 additional members whose dues were delinquent two years or less, or a total membership of about 250 —less than one-sixteenth of its present membership.

The number of veterinarians prominent in the profession and in the association 39 years ago, who have passed on, is really surprising. Of the officers at the previous Omaha meeting, only one, Dr. A. T. Peters, then vice-president, is still living; and of the personnel of all the many committees at that meeting, only five—Tait Butler, Chairman of the Executive Committee; A. T. Peters, Chairman of the Local Committee; J. P. Turner, Chairman of the Committee on Army Legislation; W. L. Williams, Chairman of the Committee on Publication, and W. B. Niles, member of the Committee on Intelligence and Education—survive.

Of the 14 who presented formal papers at the meeting, only three—L. A. Merillat, (Chicago), J. W. Connaway, (Columbia, Mo.) and Chas. Ellis, (St. Louis) — are with us now. And, other than those already mentioned, of the 43 members in attendance at the meeting, only two—G. A. Johnson and W. H. Kelly—survive. Of the 24 honorary members of the association in 1898, only one—Sir John M'Fadyean—is living. The total attendance at the former Omaha meeting, including members and visitors, was 134. An attendance of upwards of 2,000 is confidently predicted for next August.

Dr. D. E. Salmon, head of the civil veterinary department of the Federal government, was president of the association at the first Omaha meeting. Col. Robt. J. Foster, head of the military veterinary department of the Federal government, will preside at the next meeting. The former meeting was a three-day meeting, Sept. 6, 7 and 8, with clinical demonstrations each morning before the sessions began. The next meeting will be a four-day meeting, August 17, 18, 19 and 20, with the final day devoted entirely to clinical demonstrations.

In the matter of program, the only material changes that have come about in the 39 years, is the holding of sectional meetings and a larger number of papers. Although the educational requirements for entrance to veterinary colleges have been raised to include at least five years additional schooling since 1898 and the length of the veterinary course (in months) has been doubled, one notes no improvement in the quality of the papers presented at our meetings at the present time over those of two score years ago. Notwithstanding their longer schooling, leaders in the profession write no better English nor present no

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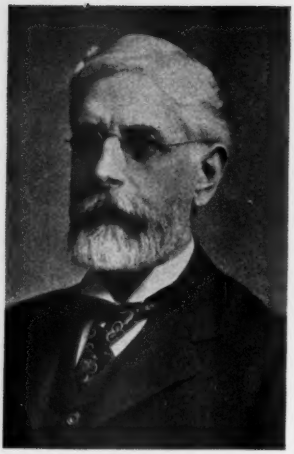
The Officers
of the
American Veterinary Medical Association
and
The Members
of the
Committee on Local Arrangements
invite every veterinarian in America
to attend the
Seventy-Fourth Annual Meeting
Tuesday, August seventeenth to Friday, August twentieth
nineteen hundred thirty-seven
Omaha



Dr. D. E. Salmon, President 1898

Dr. A. T. Peters
Vice-President 1898

Dr. O. V. Brumley, President-Elect

higher class scientific papers now than Salmon, Pearson, Stewart (Sesco), Nelson, Law, Merillat and others wrote in that earlier day, nor is there much difference in the subjects discussed. Rabies, hog cholera and tuberculosis were engaging attention then as now. However, at that time. tick fever and glanders came in for equal consideration. Filterable viruses were discussed in the president's address, as was also shipping fever. The problems discussed would be appropriate for the meeting next summer. Probably foremost among these was the need for collecting statistics on the loss from animal disease. Another was the need for informing the public concerning veterinary servce. To quote: "But he [the veterinarian] has just begun his work and the more his plans develop, and the better his efforts and aims are understood, the more will he be esteemed and appreciated."

Or again:

The work of this association must be principally of an educational character. It should begin with its own members, encourage them to study, to think and to write. It should particularly encourage original observation and investigation. It should use its influence to keep the veterinary literature of the country—the journals, the text books, and the official reports—abreast with the times and equal if not superior to any that are issued in any other country. It should also be active in educating public sentiment.

And again:

The great system of meat inspection, now happily inaugurated, should be carried to perfection, so that the consumer can buy a piece of meat in any market in the country knowing that it has been inspected and that it did not originate from an animal diseased, injured or otherwise unfit to furnish wholesome food.

A system of milk inspection should be developed which will guard against filth, the germs of tuberculosis, typhoid fever and other communicable diseases, and which will make it possible to drink a glass of milk in our cities without serious misgivings as to its effect upon our health.

It was at the Omaha meeting 39 years ago that the name of the association was changed from the United States Veterinary Medical Association to the American Veterinary Medical Association. At that time the annual dues were reduced from $5.00 to $3.00. That action was, of course, reversed later.

Fourteen veterinarians present at the meeting, were elected to membership, of whom five—J. S. Anderson, C. E. Cotton, Fred Evans, J. I. Gibson and J. D. Sprague—are still members of the association. John R. Mohler and Col. Ray J. Stanclift, although not present, joined the association at this meeting.

In 1898, the pay of veterinarians in the Bureau of Animal Industry was $1200 a year; the maximum pay of army veterinarians, $900 a year. The latter has been in-

creased 700% and the average pay of Bureau Veterinarians more than 150%.

Leonard Pearson presented the report of the Committee on Intelligence and Education; Joseph Hughes, the report on rabies, from which we learn that it was "a disease of frequent occurrence;" C. A. Cary, the report on osteoporosis, from which we learn that it was "prevalent to an alarming extent" and "is neither hereditary nor contagious."

Fred E. Pierce, resident secretary for California, reported:

California with all her fine horses and countless herds of sheep and cattle, is almost entirely destitute of any laws governing and controlling the outbreak and spread of contagious diseases. There is no board, or commission, or even a state veterinarian to whom the stock raiser can look for relief. . . . . Other states can ship into our state anything they wish to, and there is no one to say nay; but we are unable to ship a hoof across the borders because there is no one who has authority to say that they are healthy stock or that they came from a non-infected region.

R. P. Lyman, resident secretary for Connecticut, reported:

The tuberculosis laws have now been in operation a year, resulting in a physical examination of many herds of cattle and only a very few cases reported condemned. . . . . Of the more progressive sanitary measures affecting the veterinarian during recent months was the formation of the Medical Milk Commission of Hartford County, appointed and developed by the physicians of the Hartford County Medical Society. This commission was organized for the purpose of obtaining a pure certified milk supply to be used more especially by invalids and infants.

Sesco Stewart, secretary of the association, proposed that: "The president be authorized to expend association funds to the extent of $10 if necessary, to assist local committees in arranging an amphitheatre for the purpose of affording opportunity for all members to view the operations if we have clinics at our future meetings." The motion was amended to make the amount $20, and passed.

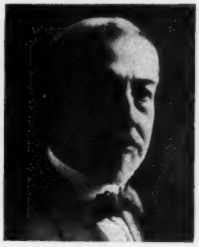
The Committee on Necrology reported that two members of the association had died during the year. Last year the same committee reported the death of 108 members and former members.

Among the resolutions, was:

Whereas, In the matter of municipal meat inspection such a system as would be of any benefit to the public is not possible under the existing arrangement of many small slaughter houses; be it

Resolved, That this Association recommends the establishment of one or two abattoirs in each city as indispensable to the rational pursuance of such a system under properly qualified veterinarians.

Dr. C. A. Cary
Com. on Diseases 1898



Dr. Tait Butler
Chr. Exec. Com. 1898

James Law presented a comprehensive discussion on "Dangers to Mankind from the Consumption of Milk from Tuberculous Animals." Sesco Stewart, Leonard Pearson, Chas. W. Heitzman and C. A. Cary all presented papers on meat inspection. Of trichinosis, Stewart said: "It is evident that this parasite is widespread and very prevalent." Roscoe R. Bell presented a paper on "Acute Indigestion in the Horse;" M. H. Reynolds, one on "State Control of Hog Cholera;" J. W. Connaway on "Practicability of Immunizing Breeding Cattle Against Texas Fever;" Chas. Ellis on "Our Milk Supply;" H. D. Fenimore on hemorrhagic septicemia, then known as "Wild Und Rinderseuche;" S. B. Nelson on "Poisonous Plants;" A. W. Bitting on "Laboratory Records;" and L. A. Merillat on "Arytenoideraphy."

The Omaha meeting in 1898 was a good one. Probably no one who attended regretted his attendance then or since. The annual meeting of the A. V. M. A. now, as then, is the outstanding veterinary event of the year in this country. The veterinarian who fails to avail himself of the educational features offered by this meeting, loses an enviable opportunity of bringing himself abreast of veterinary progress and of hearing at first hand the leaders in his profession.

Do You Remember—

1. Question.—What was the first disease shown to be of specific, bacterial origin,

Answer.—Kelser states: "Anthrax was the first of all infectious diseases of man, and of the lower animals, shown to be caused by a specific microorganism."

2. Q.—What are Koch's postulates for determining the identity of a microorganism as the cause of a disease?

A.—These postulates are: (1) The finding of a microorganism in a diseased animal; (2) isolating it in a pure culture; (3) reestablishing the disease in another animal with this culture, and (4) recovering the same organism from the second animal after it has produced the same disease.

3. Q.—Will the killed organism of tuberculosis produce lesions?

A.—According to Kelser, after being killed *Mycobacterium tuberculosis* will produce lesions which are very similar microscopically to those caused by living organisms.

4. Q.—Which of the following bacteria are "acid-fast" to stains: *Staphylococcus alba, Mycobacterium tuberculosis, Pasteurella aviseptica, Mycobacterium leprae* and *Clostridium chauvei?*

A.—Of those listed only the *Mycobacteria tuberculosis* and *leprae* are acid fast organisms.

5. Q.—Which of the following bacteria exhibit a gram negative staining reaction: *Brucella abortus, Escherichia coli, Streptococcus mastitidis, Pasteurella suisepticus* and *Shigella gallinarum?*

A.—Of the foregoing list, all are gram-negative except *Streptococcus mastitidis.*

6. Q.—What diseases do the following organisms produce: (a) *Aspergillus fumigatus,* (b) *Pfeifferella mallei,* (c) *Brucella melitensis,* (d) *Erysipelothrix rhusiopathiae,* (e) *Histomonas meleagridis,* (f) *Pasteurella tularensis,* (g) *Piroplasma bigeminum,* (h) *Salmonella anatum,* (i) *Trypanosoma equiperdum* and (j) *Vibrio fetus?*

A.—The following diseases are caused by the organisms listed above: (a) brooder pneumonia in chicks; (b) glanders; (c) undulant fever; (d) swine erysipelas; (e) enterohepatitis (blackhead) in turkeys; (f) tularemia; (g) Texas fever in cattle; (h) keel disease of ducklings; (i) dourine; and (j) abortion in mares, cows and ewes.

WESLEY O. KEEFER.

* * * *

Indiana Veterinarians

On the following pages are halftones of some of the members and visitors in attendance at the annual meeting of the Indiana Veterinary Medical Association, Jan. 19-21, 1937. Their names and addresses, right to left, follow:

Top row: S. F. Gaynor, Logansport; W. W. Lowe, Poseyville; L. M. Gootee, Loogootee; W. F. Paulish, Franklin; H. A. Sailors, Wabash; Paul F. Scott, New Market; Mr. M. C. Bartlett, Pitman-Moore Company, Indianapolis, and E. E. Clore, Greenwood.

Second row: Thos. F. Hyde, Brookville; E. S. Pentecost, Indianapolis; W. L. Hughes, Goldsmith; J. C. McDaniel, Elwood; W. C. Kortenber, New Haven; S. D. Wiles, Ft. Wayne; R. T. Sanders, Indianapolis, and W. V. Billhymer, Arcadia.

Third row: Norman Heidt, Evansville; W. F. Latshaw, Shelbyville; F. E. Pursley, Modoc; O. C. Shockley, New Ross; R. F. Smith, Boswell; C. M. Weber, Oakville; J. K. Fausset, Spiceland, and C. E. Haflich, Markle.

Fourth row: E. S. Hinkle, Centerville; W. H. Gruner, Evansville; H. R. Brown, Manilla; Earl Higgins, Bluffton; H. W. Demsey, Huntington; R. Houser,* Bourbon; G. W. Musselman, Denver, and F. W. Buckley, Greensburg.

Fifth row: Paul R. Stanley, Acton; J. L. Hiday, Fortville; W. G. Flora, Chalmers; A. M. Drudge, Bremen; C. F. Shartle, Stylesville; A. B. Rodibaugh, Carmel; V. F. Saylor, Zionsville, and H. A. Miller, Paragon.

Sixth row: J. F. Bullard, LaFayette; Mr. M. S. Barker, Thorntown; M. Tanner, Milroy; J. R. Lair, Connersville; W. G. Galloway, LaFayette; J. E. Hollis, Salisburg, N. Car.; H. E. Bryan, Angola, and L. R. Barnes, San Juan, P. R.

Seventh row: C. T. Howard, Carlisle; R. E. Kepner, New Castle; Glen Ebright, Hammond; H. J. Magrane, Mishawaka; J. W. Larrison, Kokomo; D. D. Baker, Wabash; J. C. Schoenlaub, Corn States Serum Co., Indianapolis, and J. B. Current, Topeka.

Eighth row: E. G. Pringle, Goshen; F. R. Booth, Elkhart; Mr. O. B. Griffin, Pitman-Moore Co., Indianapolis; Mr. L. L. John, Fowler Serum Co., Indianapolis; C. P. Hodson, Peru; H. F. Emick, Indianapolis; L. W. Evans, LaPorte, and J. E. Tinder, Brook.

* Deceased Feb. 16, 1937.

Efficacy and Innocuity of the Use of Living Vaccines Against Bang's Disease*

The veterinary academy of France will perhaps be consulted one of these days on the regulations to employ in the use of living vaccines against Bang's disease. At the international veterinary congress held in New York in 1934, Professor Finzi formally opposed its use and numerous authorities in the veterinary medical world agree with him.

It is not my intention to speak of the use of living vaccines (properly speaking premunition) in foreign countries nor on a large scale in France but to affirm (by figures in hand) in my modest clientele:

1. That premunition is efficacious in nearly all animals treated, except sterile females;

2. That the danger to man caused by spreading the bacilli (in particular by milk) is far from being as great as is taught. It has been nil, until now, in the 44 herds in which I employed living cultures;

3. That premunition with this vaccine has given excellent results; many breeders have conserved their herds through this method. If the use of this vaccine were prohibited, dispersal of infected herds would result and this would have the most disastrous results from the viewpoint of general prophylaxis.

As I have observed in the 44 herds to which I was called to intervene against epizootic abortion, the results are constant, manifestly successful. Immediate diagnosis is necessary and I am free to say that seroagglutination has never given me any disappointments. The research laboratories can never be lauded and thanked enough for their aid to veterinarians and breeders. The intradermal test, on the contrary, has been so deceiving that I abandoned it in spite of the practical advantages it seems to offer *a priori*.

In pregnant cows, the killed vaccine (bacterin) may be employed provided the owner is warned that it does not give the 100% calf crop that would please him so much. A subcutaneous injection every two months yielded but 55% to 65% of success. What the results would have been without treatment could, of course, not be determined without controls and besides abortion seems to strike at random.

The main success from premunition is obtained in the non-pregnant, vaccinated with a living vaccine made from virulent, fresh cultures. Two injections at an interval of 15 days are given to all non-pregnant cows and heifers two months before breeding without distinction as to group or category. In animals thus treated the abortion rate was between 2% and 3%, which, considering the chance of accidental abortion, is a magnificent achievement.

Moreover, during several years, if I make some reservations to my clients as to the results in pregnant cows, I do not hesitate to affirm in advance that certain results can be expected in the non-pregnant subjects that are not sterile. Here is the only questionable point of the live culture treatment. In some herds one observes no check in fecundation. In others, it comes to pass that one-fourth of the cows take the bull over and over for various reasons: Metritis following retained afterbirth, nymphomania, persistent "bullers," and animals affected with granular vaginitis when it adds its rôle to the brucella infection. However, by patiently treating the latter trouble, satisfying results can be obtained.

Premunition is solidly durable. Recently, I had the pleasure to observe in one herd 11 pregnant cows out of 12. Several among them were not bred for seven months after vaccination.

It is my belief that at the present time live culture vaccination is the best treatment for combatting Bang's disease. I do

*Efficacité et innocuité de l'emploi des vaccins vivant dans la prémunition des Bovidés contre le brucellose. Dr. Amiot, of Vendome, France. Communication accepted by the academy on the report of Professor Cocu. Translated from *Bulletin d' Académie Vétérinaire*, July, 1936.

not discourage the research workers nor those who believe that epizootic abortion can be a deficiency disease. It is, however, hard to reconcile the sudden appearance of numerous abortions with nutritive deficiency, the absence of the disease in neighboring herds fed in the same fashion, or with the storm of abortion that so often follow the purchase of a new animal.

In these 44 herds where I used living vaccine and where as a consequence billions of germs were added to the exterior media, I have never seen a case of undulant fever among the persons exposed. If any danger exists, as some claim, it is certainly meager and it remains to be proved that such danger is greater *with* than *without* premunition.

Summary—(1). Of 228 pregnant cows treated with killed cultures (bacterins), 72 or 31.5% aborted, not counting cows sold before term and which may have aborted after leaving my control.

2. Of 737 non-pregnant cows affected with Bang's disease, treated with live culture vaccination two months before breeding, 19 or 2.5 per cent aborted. But, as there remains 124 pregnant cows to account for and certain ones among them may yet abort, it is logical to conclude that the percentage of abortions, including accidental ones, runs between 2.5 and 3.2%.

3. Of the 737 cows, 64 or 8.65% remained sterile. But this figure is too low because one must take into account not only the 40 cows sold or fattened for the butcher but also those which may have conceived. The percentage of sterility in infected herds can be placed around 12% according to my statistics, but varies widely of course among the different herds of a community and also among different communities.

4. Not a case of human undulant fever was observed among the persons exposed to the animals treated with the living vaccine.

Experimental Production of Roaring

In order to make exact clinical and anatomical studies[78] of roarers, neurectomy of the left recurrent nerve, and six weeks later neurectomy of the right recurrent nerve was performed in an experimental horse. The first operation resulted in the occurrence of roaring with all its clinical manifestations. The second operation resulted in pronounced dyspnea and a collapse of the laryngeal cartilages. The autopsy revealed atrophy of the musculus cricoarytaenoideus dorsalis and pronounced degenerative changes of the recurrent nerve. In another experimental horse typical roaring was produced within six days following the injection of diluted strangles-pus into the area between the trachea and carotis. Pronounced degenerative changes were found throughout the entire length of the nervus recurrens. A third experimental horse which was injected with undiluted strangles-pus into the same region, exhibited transient roaring only. The histological examination of the n. recurrens disclosed degenerative fatty infiltration of occasional nerve fibers solely.

A fourth experimental horse injected with 1cc oil of turpentine into the region of the right recurrent nerve exhibited merely transitory roaring, while the injection of neo-salvarsan into the same area did not produce roaring.

These experiments prove that roaring may occur following remedial injury and artificial infection with strangles. Whenever a lymph node adjacent to the n. recurrens becomes abscessed, then the inflammation will spread to the nerve and may cause roaring. The explanation for the observation that the left recurrent nerve is found paralyzed the more often may be the close proximity of this nerve to the bronchial and anterior mediastinal lymph nodes which frequently become affected in strangles.

Anthrax In Swine

By L. ENOS DAY,
Chicago, Illinois

The Author

ANTHRAX is primarily an acute febrile infectious disease of herbivorous mammals caused by the bacillus anthracis. It is capable of spreading to omnivorous and carnivorous mammals. The disease is characterized anatomically by serous hemorrhagic infiltrations of the subcutaneous and subserous connective tissue, and by an acute swelling of the spleen. The swelling of the spleen is always present in herbivorous mammals, but may or may not be present in omnivorous mammals. Anthrax has made its appearance in various parts of this Continent. In the United States, it is especially prevalent in states bordering on the Gulf of Mexico. In these states it appears with variable virulence annually, where extensive losses from 30,000 to 50,000 animals have been recorded. Anthrax is also quite prevalent in some regions of the upper Missouri River and local outbreaks have been reported from other states. In locations where anthrax makes its appearance in horses, cattle and sheep, it is very liable to spread to swine if proper disposal is not made of the carcasses and of escaping blood of the dead animals.

Susceptibility

Susceptibility of domestic animals to anthrax varies greatly, sheep, horses and cattle in the order named are very susceptible, goats to a less degree. Dogs and cats are quite resistant and contract the disease only from a massive or repeated exposures. The susceptibility of swine to anthrax is about midway between that of herbivorous and carnivorous mammals. The mortality rate is high in herbivora, much less in omnivora and still less in carnivora.

Etiology

Anthrax is caused by the multiplication of the bacillus anthracis in the blood and body fluids of susceptible animals. The bacillus is 1.5 to 4.0 microns long and 1 to 1.5 microns broad. It is nonmotile and multiplies by fission and spore formation. When growing in the body fluids the bacilli are covered by a distinct capsule and form chains three to eight links long. When grown on artificial culture media the chains are many times longer. Spores form only in the presence of oxygen when the temperature ranges from 53°F. to 106°F.

The contagious nature of anthrax was established as early as 1836, by successful inoculation as well as by feeding blood of infected animals. The bacilli were first recognized in the blood in 1850, and, were first artificially cultivated in 1876.

Mode of Infection

Natural infection in swine occurs through the digestive tract by the ingestion of flesh or blood which contain anthrax spores. Owing to the high degree of resistance in swine to anthrax, they seldom if ever contract the disease through the water supply, as do horses, cattle and sheep. If the flesh or blood consumed by swine is small in amount and contain bacilli in the vegetative form, the bacilli are usually destroyed by the gastric juices. But if a large amount has been ingested some of the meat or blood may pass through the stomach undigested and produce infection. If the flesh or blood, even in very small amounts, has been exposed to the air at a temperature of 53°F. to 106°F. for a sufficient length of time for spores to form on the surface, the spores when ingested will pass through the stomach unaltered and germinate in the intestinal tract. In all cases there is a possibility of infection by bacilli in the vegetative state through abrasions in the mucous membrane of the mouth and pharnyx. From the clinical appearance of the infection in swine, which is usually manifested as an ulcerative stomatitis and laryngitis, it seems evident that the anthrax bacilli enter the deeper tissues through the pharyngeal mucous membrane.

As before stated, swine are far more resistant to anthrax infection than herbivorous mammals. This natural resistance explains why local lesions at the point of infection are seen much more frequently than the septicemic form of the disease, which occurs with regularity in solipeds and ruminants. The portal of entry of the infection is usually the alimentary tract, particularly the oral and pharyngeal cavities. The spores lodging on the tonsils germinate into bacilli, penetrate the tonsilar tissue through the crypts or abrasions and from there pass along the lymph vessels into the lymph glands and finally into the blood stream. Vegetative bacilli follow the same course. Spores reaching the intestinal canal germinate into bacilli which enter the mucous glands and the lymph follicles.

In localities where anthrax is known to exist on certain premises, swine on other more remote farms may be found affected with anthrax. The veterinarian may be at a loss to explain how the swine became infected when the horses and cattle on the farm, which are more susceptible, are not infected. In such cases it frequently happens that tankage from rendering plants which are not supervised by federal or state regulations is the source of infection. The tankage is sterile when it is removed from the tank but becomes contaminated while in storage by particles of dried blood falling into it from clothing of employees. The writer has seen such outbreaks in swine when the only possible source of infection was through the tankage which was purchased from a nearby tankage plant where the carcasses of animals dead of anthrax had been rendered.

Upon investigation of the practices in the plant, it was obvious that contamination of the stored tankage could occur very easily.

Symptoms

Septicemic anthrax in swine is relatively rare. This type of anthrax is characterized by a marked depression, inappetence, high temperature, and death usually within a few hours. A bloody fluid usually escapes from the natural openings in a hog dead of anthrax. The most common type of anthrax in swine is localized and is manifested by dullness, high temperature and swellings in the submaxillary or pharyngeal region. The ocular mucosa is usually congested. As the disease progresses, breathing becomes difficult and there may be dyspnea. In some cases the animals will sit on their haunches and gasp for breath and many die from suffocation.

The course of localized anthrax in swine varies, but as a rule the affected animal dies in a short time.

Anatomical Changes

The anatomical changes in anthrax in swine are varied, ranging from a single anthrax carbuncle to the fulminating septicemic type of the disease; the latter being very rare. The primary local changes occur most frequently in the alimentary tract, particularly in the oral and abdominal cavities. As soon as a nidus is established, hemorrhagic inflammation progresses rapidly until the infected tonsil wholly or in part is broken down. As a rule only one tonsil is involved. The tissue around the infected tonsil is inflamed and edematous, in some cases necrotic. Vesicles or ulcers occasionally appear on the mucous membrane or skin covering the affected area. In severe infections the subcutaneous tissue of the guttural region is greatly swollen and edematous. On incision the edema appears gelatinous and translucent. The swelling and serous infiltration may be of sufficient extent to produce death by suffocation. In addition to a marked gelatinous hemorrhagic infiltration of the pharyngeal connective tissue and the retro-pharyngeal lymph glands, the tonsils are covered by a strongly-adherent, pale-yellow, pseudo-membrane.

The submaxillary lymph glands, on one or both sides, are swollen, quite firm and dark-red in color. The incised surface is moist; later becoming dry and crumbly, dark-red in color, and containing one or more blood clots. Areas of necrosis, and occasionally abscesses may also be found. Abscess formation is the result of liquefying bacteria developing in the broken down areas, and is evidence of chronicity. If the course of the disease is prolonged, with-

out abscess formation, the cheesy necrotic area, or the entire gland becomes encapsulated. This encapsulated sequestrum is easily removed from the capsule as a moderately dry, crumbly mass. The lesions in the lymph glands may be of various ages. A yellowish gelatinous edema usually surrounds the lymph gland, unless the disease process is of long standing, in such cases the edema will have subsided.

The intestinal form of the disease is not so common as is the infection in the oral cavity. When present the duodenum is the common seat of the disease, and the lesions are of varying intensity. In mild cases only petechiæ are found, while in the more severe cases the entire intestinal wall shows sero-hemorrhagic infiltrations with a tendency to necrosis. The process begins with hyperemia which steadily increases to an extravasation of blood into the inflamed parts to the extent of producing necrosis of the intestinal walls. The extravasations are at first light red, later dark-red, and finally brownish-red to brownish-green in color. If the invasion of anthrax organisms is not limited to individual areas in the intestinal wall, but is more widespread, the affected section of the intestine becomes thickened and bluish to brownish in color, and marked serous gelatinous infiltration occasionally develops. Frequently, fibrinous deposits which develop on the serous surface of the intestine cause adhesions between the individual coils of the intestinal tube. The intestinal content is bloody. The mucous membrane when washed shows changes from red to bluish gray depending on the amount of necrosis present. Should the necrotic process extend deeply into the intestinal wall perforative peritonitis may result. In isolated cases the large intestine shows similar changes. The picture of intestinal anthrax is completed by petechiæ, hemorrhages, and even necrotic areas in the omentum. The chain of intestinal lymphatic glands is always involved in extensive cases, but may not show any abnormal appearance in very mild cases.

The septicemic form of anthrax in swine is exceedingly rare. When present, the spleen is enlarged to several times its normal size. The color is bluish-red and on incision the dark-red pulp flows from the trabecular spaces. In less severe cases the spleen frequently contains only round knotty, hemorrhagic foci, varying in size from an eighth of an inch to an inch in diameter. On palpation these foci are firmer than the rest of the organ. When incised they can be distinguished by their brown peripheries and slightly graying centers. Hemorrhages are common in the heart, kidneys and serous membranes. Fibrinous exudates are frequently seen on the peritoneum, pleura and pericardium. The liver is greatly congested and dark brown in color. Small necrotic areas surrounded by a hyperemic zone are usually present. The lungs may contain hemorrhagic foci also. The blood is a very dark red and coagulates poorly.

Bacteriological Diagnosis

All cases of anthrax in swine should be confirmed by demonstrating the presence of the bacillus anthracis in the tissues. If the lesions are acute there is no difficulty in demonstrating the presence of the bacilli in either smears, cultures or by animal inoculation, if material from the highly inflamed tissues are used. In the local cases where the infection is confined to the lymph glands of the neck and tonsils and the process is subacute or chronic finding the organisms may be very difficult. It is important to select material from the edge of the necrotic area or areas for examination. In smears prepared from material from such cases one is liable to find the bacilli degenerated and only the swollen empty capsule remaining. If smears prepared from such material are stained with polychrome methylene blue, the swollen capsules will be stained a very light pink and any portion of the bacilli remaining will be stained blue. These empty capsules have been referred to as "shadow forms." Guinea pigs injected subcutaneously, even with large quantities of materials containing shadow forms, do not succumb to the infection, but if two or three grams of such material is finely divided in sterile salt solution and streaked over the surface of a dozen or more Petri dishes containing neutral agar agar, anthrax colonies may develop on some. The writer has found

this to be the most satisfactory way to demonstrate bacillus anthracis in the tissues of chronic anthrax in swine.

Prevention and Treatment

Anthrax in swine has its source directly or indirectly in other animals infected with anthrax or in the carcasses of animals dead of anthrax. The feeding of such carcasses to swine is a relatively common procedure and is frequently the source of anthrax in them. The contamination of lots, pastures, feed and water by diseased animals and carcasses of animals, dead of anthrax, provides further means of anthrax infection in swine.

Thus the plugging of all natural openings of carcasses dead of anthrax and the immediate disposal of all carcasses and discharge by cremation or proper burial and liming, coupled with effective quarantine reduces the occurrence of anthrax in swine to a minimum.

The administration of anti-anthrax serum to directly exposed swine has apparently prevented the spread of the disease in several instances. A few practitioners have reported the successful treatment of some infected swine with anti-anthrax serum. Some practitioners recommend the use of a second dose of serum in 12 to 24 hours, unless the fever subsides. The dosage of serum should be liberal whether it is used in exposed or diseased swine.

Vesicular Exanthema of Swine

At the Animal Disease Station of the Bureau of Animal Industry, Beltsville, Md., two samples of virus, recovered from swine in fresh outbreaks of an exanthematous disease in California were received for a differential diagnosis of vesicular exanthema or foot-and-mouth disease. One virus was found to be infectious for equines as well as swine, and the other only for swine. Neither of the viruses was found to be capable of producing lesions in cattle or guinea-pigs. A positive diagnosis was made, therefore, of vesicular exanthema in both cases.—*Report of the Chief of the B.A.I., 1936.*

Types of Tuberculosis in Hogs

The type differentiation of tuberculosis of hogs is of great importance for the efficient control of tuberculosis in man and in the domestic animals.[35] Of 162 hogs found tuberculous during meat inspection, tubercle bacteria were found in 103 hogs. The type was determined in 97 cases. The human type was found 16 times; the bovine type once, and the avian type 80 times.

Anti-Sterility Factor

It has been suggested[41] that sprouted oats may contain a vitamin or other substance which perhaps induces pregnancy in animals that are temporarily sterile. Early experiments with feeding sprouted oats to such animals gave rather favorable results, but for lack of controls, definite conclusions were not possible. Therefore, an experiment was planned in which every other breeding animal, exhibiting a certain abnormal breeding behavior was fed sprouted oats and the alternating animals were placed in control groups.

Of 15 oat-fed sows, thirteen produced litters; of sixteen control animals, twelve produced litters. In addition, three of five sows that were fed sprouted oats after having failed to conceive for a long period in the control groups finally produced litters. While there is some indication here that feeding sprouted oats was of some value when fed to shy breeders, the evidence is by no means conclusive. All sows in the University piggery, including both oat-fed and control groups were generally fed at least one pound of green alfalfa or other green feed per sow per day. If sprouted oats contain some substance resulting in a beneficial action on shy breeders, it is possible that the same substance may be found in other green feeds. The feeding of sprouted oats to shy breeders might show more definite results if other green feeds were withheld from the experimental animals.

[35] Holth, H. and Amundsen, H. 1936. Type differentiation of tuberculosis in hogs in Eastern Norway. (Transl. title.) *Norsk Vet.-Tidsskr.* 48:2-17.

[41] Henke, L. A. 1935. Results of feeding sprouted oats to correct sterility in cattle and swine. *Jour. Agric. Research.* 50: 51-59.

Indications for Steam Bone Meal in the Canine Diet

Steam bone meal used for feeding purposes should be made of fresh bones of suitable quality, cooked under steam pressure very thoroughly. The bone residue is pressed and dried and then ground for sale as steam bone meal. It is sold at feed stores at a very low lost. The higher grades of steam bone meal should be nearly white in color and have very little odor. The steam bone meal used for fertilizing is of a dark color and has a rank, disagreeable smell. It should not be fed to dogs.

The accepted chemical analysis of steam bone meal is: calcium 32.61%; phosphorus 15.17%; potassium 0.18%; sodium 0.52%; magnesium 0.85%; sulphur 0.40%; chlorine 0.09%; silicon 0.52%; and of iron, a trace.

Steam bone meal is used in the veterinary clinic of the Kansas State College as an intestinal styptic. In no case of more than a hundred dogs in which it was used did it completely fail to check the diarrhea. Although large doses were necessary to accomplish these results in some cases. However, it should be noted that it was used only in mild cases of diarrhea resulting from dietary disturbances. No conclusion is drawn as to the merits of bone meal in other types of diarrhea such as parasitic, ulcerative or the chronic form.

The effective dosage was determined to be one to five drams of the steam bone meal added to the diet, twice daily. The exact dose varied with the individual case depending principally on the size of the dog and consistency of the feces. If the feces remain soft after a day of treatment it is well to increase the dosage. However, if the feces become hard the steam bone meal should be discontinued. There is no evidence of harmful effects of overdosage except that prolonged overdosing produces constipation.

In addition to checking diarrhea steam bone meal is a suitable mineral supplement for growing, pregnant and lactating dogs, or dogs that require liberal amounts of calcium and phosphorus in the diet. The metabolism of calcium, phosphorus and of vitamin D is closely interrelated. For proper nutrition it is necessary that these elements be present in the diet not only in adequate amounts but also in a proper ratio to each other and such is found in steam bone meal. Proper mineral nutrition of the dog assures a strong and sturdy skeleton and prevents the development of rickets, pica and osteomalacia.

Beyond doubt, steam bone meal may be employed by the small animal practitioner in the canine diet to great advantage in animals having soft bowel movements not due to serious causes.

I. J. TWIEHAUS, K.S.C. '37.
Manhattan, Kans.

B. C. G. and the Reaction to Tuberculin

The following translation from *Le Progrés Agricole*, (January 24, 1937), a prominent agricultural magazine of France, contains this interesting discussion in its veterinary column about the use of B. C. G. vaccination in controlling bovine tuberculosis:

"*Question.*—December 10 I purchased a cow for 3,900 francs; on the 19th she reacted positively to the tuberculin test. I immediately telephoned the fact to the dealer and was told by letter that the cow had been regularly inoculated with B. C. G. until she reached adult life. She was then six years of age. In the same letter the seller said that it was natural that the cow should react, but agreed to take her back as soon as the weather permitted. Several days later she suffered an attack of acute mastitis and died thereof December 28. The autopsy revealed the presence of tuberculous lesions in the pulmonary glands. Who should be the loser?

"*Reply.*—I will recall the exactitude of the thesis I have always supported in the colonies. Vaccination against tuberculosis is perhaps inoffensive, but it is not efficacious. Yours is a typical case. An animal vaccinated reacts and the autopsy shows striking lesions of tuberculosis. I also claim that B. C. G. vaccination hinders considerably the prophylaxis of tuberculosis.

"You have the proof that the cow had tuberculosis and that she reacted as a result of it, but you have no recourse because you did not return her within the 15 days prescribed by law. It does not matter whether or not the cow had been vaccinated."

Aristotle described about 170 birds in his writings on nature.—*S. N. L.*, 31:835.

* * * *

Difficult urination in the newborn foal (male) may be relieved by using a milk fever pump. Insert the teat tube in the urethral canal and compress the bulb two or three times. This opens the neck of the bladder sufficiently to release the flow of urine. I have never used this treatment in the dog, but intend to try it. It would be more convenient if it works, than catheterization.—*W. B. Redman.*

* * * *

Less than 10 chicken varieties are commercially important in this country, though 140 standard varieties are recognized.—*S. N. L.*, 81:835.

Courtesy The National Horseman

One of the sad sights following the Ohio River flood of last winter. At another place a mule was left hanging by the head in the fork of a tree more than 30 feet from the ground.

Demodetic Mange of Dogs

By IRVIN IRWIN, Manhattan, Kansas,
Kansas State College, Class of '37

DEMODECTIC mange is a parasitic, skin disease of practically all domestic animals and man. It occurs in all breeds of dogs, but most often in the short-haired varieties. The disease is communicable by contact, only in very young puppies. Some believe that infestation occurs in practically all young puppies; that the parasite is present in the skin of all older animals and that it flares up only when the skin and general body resistance is lowered, as in debilitating diseases, or unhealthy conditions of the skin. Whether or not there is some as yet unknown means by which dogs may be infected after the first few days of extra-uterine life, is not definitely determined. Age and heredity seem to play a part. Young dogs are most often affected and a whole litter may become affected while other dogs, that have associated with them, do not contract the disease.

The *Demodex canis,* the causative factor in demodectic mange, is a parasite about 0.25mm in length. The thorax bears four pairs of stumpy legs and the elongate abdomen is tranversely striated on the ventral and dorsal surfaces.

Symptoms

Demodectic or follicular mange is usually chronic, only occasionally is an acute case seen, in which there is a sudden flare-up, which may involve a fairly large portion of the skin of the animal. It is characterized by many small red blebs, and usually by a mild pruritus; loss of hair; thickening and wrinkling of the skin, which becomes scaly and is usually reddened, later becoming bluish purple or acquiring a coppery red color. The pustular form, due to secondary bacterial infection, usually staphlococci, is less common. Pustules may develop into large abscesses and even nectrotic foci in severe cases. Any portion of the external surface of the dog may be affected. The under surface of the abdomen or inner surface of the legs, where the hair and skin is thin, is invaded only in advanced cases where the parasite has spread over the entire body.

The first symptoms are falling out of the hair, nearly always in a small spot, accompanied by small red pimples, reddening and thickening of the skin in that area, followed later by scaling of the epithelium. The condition spreads slowly by extension from the original foci, but may spread to other parts of the body by contact in a short time, especially from the head to the forelegs from scratching. Usually infection may first be found around the eye, causing loss of hair from the eye lids, and opthalmitis. This may be confused with some other eye condition, but the continued loss of hair and thickening of the skin soon leads one to suspect some condition other than infection in the eye itself.

The area around the muzzle, under surface of the lower jaw and neck, quite often shows severe lesions as these parts may contact almost any portion of the animal's body which may be affected.

Diagnosis

Diagnosis is made by making a microscopic examination of deep skin scrapings from an infected area, preferably a small postule or pimple. The scraping must be made deep because the parasite lives in and around the roots of the hairs. The parasite is quite often difficult to find, even in numerous microscopic examinations. Especially is this true after the animal has been treated by any local application as this seems to drive the parasites deeper into the skin and make them more difficult to find.

Diagnosis is sometimes made easier by boiling the skin scrapings in a 10% sodium hydroxide solution for a few minutes and then examining the sediment. The sodium hydroxide dissolves the hair and epithelial cells without destroying the parasite.

Differential diagnosis of demodectic mange and sarcoptic mange is seldom difficult, because of the difference in lesions. Microscopical examination permits positive diagnosis in either case.

Treatment

In order to get the patient in the best physical condition, which is important in treating any skin condition, the patient should be closely checked over and treated for any other condition which may interfere with its health. Well-balanced, highly-nutritious food should be supplied. It has been shown that by adding to the diet a vitamin mineral supplement, that the results of treatment are much better and the time necessary to correct the condition is lessened. Vitamin G or B_2 is very important in maintaining a healthy skin in dogs.

Egg of Demodex folliculorum, three stages of the immature and the mature "grub"

Rotenone preparations are universally used for the local treatment. There are various preparations of rotenone put out by the different phramaceutical houses, all of which produce about the same results. One may make up the preparation by buying the pure rotenone and other ingredients necessary, such as:

Oil Preparation

Pure rotenone 5gm
Acetone 125cc
Olive oil or cotton seed oil.....370cc
Dissolve the rotenone in acetone and add oil.

Alcoholic Solution

Pure rotenone 5gm
Acetone 125cc
Alcohol 370cc
Dissolve the rotenone in acetone and add alcohol.

The oil preparation usually gives the better results, as it has a tendency to keep the skin soft and pliable. It has disadvantages in cases where the animal treated is a house dog and the owner wishes to keep the patient at home during the treatment. Oil preparations should be applied to only one-half the surface of the animal at a time, alternating in the portion treated.

Alcoholic solutions are preferable for dogs which are to be kept in the home. The solution dries quickly after an application, but is slightly more irritating to a sensitive skin, and has a tendency to leave the skin too dry. The results are practically as good as from the use of oils.

External treatment consists of applying one of the rotenone preparations and massaging vigorously. This is necessary in order to get adequate penetration down into the hair follicles where the parasite lives. Treatment may be given as often as twice a week, probably every five days is sufficient. More frequent treatment causes more irritation of the skin and more discomfort to the patient.

In cases where there are large pustules and necrotic areas, local daily treatment with antiseptics in addition to the rotenone treatment, gives the desired results.

Other internal treatments which may be of value, are:

1. Forgan, a germ-free fetal extract. This product, given in hypodermic injections of 3 to 10cc doses at three to five-day intervals, helps in many cases.

2. Sodium cacodylate, an arsenical preparation, also helps to build up the resistance of the skin and may be given in relatively large doses as the dog soon acquires a tolerance to it.

The resistance of this parasitic condition to treatment necessitates treament over long periods to effect a complete cure. Seldom can a cure be affected in less than six to eight weeks, and in cases of long standing, it is necessary to continue the treatment much longer, often as long as five or six months. The first evidence of recovery is growth of new hair and the thinning of the thickened skin.

If treatment is successful, reoccurrence rare, especially in patients fed properly.

Municipal Meat Inspection

By E. W. LITTLE, Amarillo, Texas

Municipal meat inspection has not received the recognition from the general public that other health measures of no greater importance have received in the past 20 years, and the lack of such inspection in municipalities of 10,000 to 200,000 population, is deplorable. That a city meat inspection ordinance, properly drawn and efficiently carried out, is a necessity in any thriving city, is amply shown by our experience with the operation of such an ordinance in this city of 50,000 population.

Salient provisions of our ordinance are:

Meat offered for sale for human consumption must bear an official stamp of inspection from an approved abattoir. The method of inspection must be identical with that used by the Bureau of Animal Industry, and must include ante-mortem and post-mortem inspection. The result of the inspection must be kept carefully recorded. The offal and portions condemned must be removed immediately, to the reduction plant. All equipment used in slaughtering must be thoroughly clean before using it. All employees handling meat must twice yearly submit to a health examination to establish their freedom from contagious or infectious diseases. Persons handling meat must report for work clean, and dressed in accordance with sanitary standards. No person shall be permitted to spit on the floor. Sanitary drinking fountains, toilet rooms and dressing rooms shall be provided for the employees. Their location must be separate from the place where meat is stored or handled. These latter rooms must be free from objectionable odors and must be screened against flies and vermin. Butchers who handle diseased carcasses must clean their hands and sterilize their instruments before handling healthy carcasses. Meat products which fall upon the floor must have the soiled portion removed, or be condemned. The carcasses of slaughtered animals must remain eight hours in the refrigerator before being offered for sale. Vehicles in which meat is transported must conform to certain standards. All places, where animals are slaughtered, must conform to the regulations of the City Health Department. The food inspection shall be carried out by a licensed, graduate veterinarian. Violation of the provisions of the ordinance are punishable as a misdemeanor.

If the public were informed in the matter it would be the desire of both the citizens and the governing bodies of our smaller cities to be furnished the same safeguards for their meat that is provided by the Bureau of Animal Industry of the U. S. Department of Agriculture for meat shipped interstate. No one voluntarily accepts food of questionable cleanliness or doubtful wholesomeness. However, the expenditure necessary to meet the hygienic and sanitary requirements of government inspection is too great for the owners of small, improperly constructed slaughter houses.

Our meat inspection ordinance cannot be considered confiscatory in the course of its application and enforcement. People are always in a receptive mood for anything that tends to the betterment of their living conditions, such as sanitation as it pertains to food and health. The same is true of the slaughter house owner when he is shown that through the medium of sanitation and the correct application of such safeguards as are required by this ordinance, his business becomes better and his efforts are fully rewarded by a satisfied and discriminating public.

We are blessed with climate where the sun shines 90% of the time. We would be led to believe that it is a very healthy place in which to raise livestock. Our dairy herds are subjected to the tuberculin test every year, showing less than 0.1% infection. In the face of these facts, however, we have found it necessary to safeguard our public with a meat inspection ordinance which, among many things, forbids the sale of any country-killed animals or animal products within our corporate limits. During the past three years, our postmortem inspections have included 37,545 cattle and calves, 28,110 hogs and 316 sheep, goats and buffalo. As a result of this inspection, the condemnation amounted to 168,965 pounds of meat, which includes whole carcasses and parts which were either diseased or otherwise unfit for human consumption. This does not include condemnation of meat and meat products in our retail markets.

I read with interest the article (*Vet. Med.*, July, 1936, p. 281) under the heading "Six Million Pounds," and which goes

on to say: "Of What? Of meat, sold to the people of the United States, which for the most part has no proper inspection. That is, that one of every three pounds of meat bought by the consumer in this country bears no stamp guaranteeing it fit for human food." Any two to one mixture makes a very potent article, whether it be good or bad. It is very gratifying to me to know that our city has been instrumental in eliminating through our meat inspection ordinance, the hazards of any such mixture or concoction of meats.

The personnel of the meat inspection department of any city should consist principally of veterinarians. Even though graduate veterinarians are used, they should be required to have had an experience of at least 30 days in post-mortem inspections in packing houses having B. A. I. inspection. This is required to familiarize them with post-mortem examination rules and regulations and the routine employed in making such inspections. The veterinarian should be registered with the state in order to cooperate with the live stock regulatory authority of the state in cases involving control of animal diseases within the state. The veterinary meat inspector can keep a check on local livestock diseases through his ability to identify and trace the ownership of stock which has been found diseased upon postmortem examination. This is a service to livestock owners which they appreciate.

In my inspections, I have reported numerous cases of tuberculosis in hogs to the state officials, who have, in turn, materially corrected the disease conditions on the farms from which the animals were shipped. One thing incident to this follow-up inspection, which is of interest, is the fact that nine of every ten cases of porcine tuberculosis investigated have been found to be of avian origin. This brings up a subject of great importance, viz., avian tuberculosis and market inspections and postmortem inspection of poultry. This, I fear, is a problem that the next generation will inherit and I hope will be able to handle better than we have managed it.

Summarizing the municipal meat inspection problem, a few suggestions taken from an experience of 30 years in public health work may be of interest or benefit to other communities. All cities or towns of 1,000 population or over, should make some provisions by ordinance for meat inspection.

Municipal abattoirs are good in the beginning. They soon become political footballs, in which case they are bad.

The fee system to maintain the inspection is bad. Pay for it out of the general fund.

Correlation of the inspection service, Federal, state and municipal is desirable. Start with the owner of the local slaughter house. He is interested in giving the public what they desire. By gradual suggestion and help you will soon have a going institution, which will be an asset to the company without the confiscation of property.

Politics and veterinary service do not mix.

Make a meat inspection ordinance, applicable to your community, your Number One project for the coming year.

Death of Twin Foal in Utero Induces Milk Secretion

February 2, 1937, I was called to see a five-year-old mare, bred May 2, 1936. The owner reported that she had been "making bag" for three weeks, and that morning he noticed milk coming from the teats. The udder was tense and congested, with edema of the contiguous tissues. Normal milk was present in the udder.

Her physical condition was excellent and a rectal examination revealed a viable fetus. She had been on a high protein feed, with no exercise, and when this was corrected, her udder returned to normal.

It has been my experience that premature milk secretion in the mare indicates death of the fetus in utero, or impending abortion, therefore I was not surprised when the owner called me April 1st, saying the mare had foaled twins the preceding night; one apparently fully developed, but smothered to death in the fetal membranes, the other a small, mummified fetus.

EDWARD E. THOMPSON.
Roanoke, Va.

Bacterial Diseases of Poultry*

By G. L. DUNLAP, Urbana, Illinois,
Associate, Animal Pathology, University of Illinois

IN DISCUSSING bacterial diseases of poultry there are a number of problems which must be considered. First of all, domestic fowl do not suffer from as many bacterial infections as do our domestic animals. The reasons for this are stated to be due to the high body temperature and to the high metabolic rate of fowl. In spite of this there are many bacterial diseases that are troublesome in Illinois farm flocks.

The problem of the flock owner is that of control. The question of sanitation, housing and feeding are usually individual problems on each farm. Flock treatment versus individual treatment varies with the type of disease, the season of the year and the value of the stock.

According to the summary of autopsies[1] conducted at this laboratory bacterial diseases are second in order as cause of death, parasitic diseases leading the list. Losses ascribed to bacterial diseases account for about 30% of the total. The summary reveals that pullorum disease is the most common bacterial disease encountered, fowl cholera, fowl typhoid, tuberculosis and botulism accounting for only a small percentage of the losses.

Pullorum Disease

In spite of the fact that adequate control and eradication methods have been developed for pullorum disease, it still takes a heavy toll of baby chicks. Aside from losses in baby chicks from this disease the following added factors contribute to the economics of the disease:

1. Lowered egg production.
2. Lowered fertility.
3. Lowered hatchability.
4. Increased number of weak, cull chicks.
5. Uneven growth in surviving chicks.

Pullorum disease assumed two forms in birds, (1) acute septicemia in baby chicks and (2) an active, chronic infective form in the adult. Diagnosis of pullorum disease in chicks usually requires a bacteriological examination but in some instances may be recognized by the presence of necrotic foci in the lungs, myocardium and liver. Losses may begin the first day after hatching and continue for about three weeks. The peak of the deaths is around the seventh to the ninth days; from then on the losses recede. There is no form of effective treatment at this stage. Affected chicks that recover develop a subacute or chronic type of the condition. The disease becomes localized. The chief site of localization is in the ovary but the causative organism has been isolated from most of the other organs and tissues of the fowl. This ovarian infection is the primary factor in propagating the disease in flocks since the organism is transmitted through the egg to the chick. Pullorum disease eradication has been conclusively demonstrated by application of the agglutination test and disposal of carrier birds.

Tuberculosis

Tuberculosis is still a common poultry disease in Illinois. Out of 6,800 autopsies, 2% to 3% were affected with the tubercle bacillus. This condition requires a long incubation period and the individual may be infected for a long time before reaching the clinical horizon. The tubercle bacillus has been reported to live in the soil in a viable condition for almost two years. Since the onset of the disease is so slow the disease is seldom recognized in birds under one year of age.

Tuberculosis is recognized by changes which are quite characteristic. There is marked emaciation, ruffled unkempt feathers, paleness of face and sometimes diarrhea. Small, hard, grey tubercles are present in the liver, spleen and intestines. Acid

* Abstract of Paper presented at the Seventeenth Annual Illinois Veterinary Conference, University of Illinois, Urbana, November 12-14, 1936.

[1] Graham, Robt., and Michael, Viola M., 1936. Epizootological Data from Laboratory Diagnoses; *Veterinary Medicine;* 31:3, pp. 114-24.

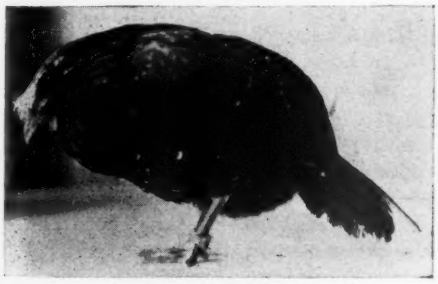
fast organisms can be demonstrated in smears from these nodules.

The long life of the organism in the poultry yards and the slow progress of the clinical disease make control measures difficult. The disease can be eradicated by the use of the tuberculin test if the quality of the stock warrants. Otherwise, a program of rigid sanitation and culling should be undertaken. Birds over one year of age should be removed from the premises. It is only after the persistent culling and thorough cleaning that the disease can be controlled. There is no medicinal cure or treatment for tuberculosis.

Fowl Cholera

Fowl cholera was reported as the cause of death in between 4 and 5% of the 6,800 autopsies. Two forms of cholera are recognized, acute and chronic. In the acute type birds will be found dead without showing any previous symptoms. Lesions in birds dead of cholera are not significant. Passive congestion, fibrin flakes or exudate on the peritoneum, ruptured yolks are quite common, hemorrhages on epicardium and gizzard fat. These hemorrhages are not characteristic, however, since they may be present in any suffocative type of death.

In the chronic type of fowl cholera the bird loses its appetite, sits around on the roost and takes no interest in life. There is usually a greenish diarrhea. There may be a chronic infection of the nasal sinuses and in these instances cholera may be mistaken for coryza. Cholera tends to appear each succeeding year once it has been introduced. Birds recovered from cholera have been demonstrated to carry the infection in the nasal passages and transmit the disease to susceptible individuals.



Fowl Typhoid

Fowl Typhoid

Fowl Typhoid is an acute septicemic type of disease caused by *Salmonella gallinarum*. It may be mistaken for fowl cholera. Mortality is not very high. A very marked congestion, bile-stained (mahogany colored) liver is quite suggestive of fowl typhoid. Both fowl cholera and fowl typhoid require a laboratory examination for diagnosis. The close relationship of *S. gallinarum* to *S. pullorum* leads to errors in the interpretation of agglutination tests for pullorum disease.

Botulism (Limberneck)

Clostridium botulinum types A and C are both responsible for "limberneck" in chickens. Spoiled feed, canned goods and decaying carcasses are the chief sources of the toxin. Botulism presents a characteristic picture and can be diagnosed from the clinical appearance. There is a paralysis of the muscles, especially of the muscles of the neck, the bird rests its beak on the ground and the neck is flacid. Another common symptom is loosening of the feathers.

Removal of the source of the toxin will control botulism. The use of antitoxin may be of benefit in valuable birds if given early.

The Carrier Feature of Poultry Diseases

In the treatment and control of poultry diseases it is necessary to keep in mind the importance of the "healthy" carrier bird. Most poultry diseases live from one generation of birds to another by means of healthy-appearing but chronically affected individuals. Mechanical cleaning and the application of a good disinfectant to the poultry equipment is always advisable but such procedure cannot be expected to give perfect results when the infection exists in one or more living birds. In some outbreaks, even if the disease has run its course, it may be advisable to dispose of such birds before exposing the young stock the following year.

A Rabbit Ovulation Test for Equine Pregnancy

Report of the Second and Third Years' Work

By JOHN J. ARNOLD,
East Lansing, Michigan,
Division of Veterinary Science,
Michigan State College

EXPERIMENTS with the rabbit ovulation test for the diagnosis of pregnancy in mares were begun early in the spring of 1934 and were continued throughout 1935 and 1936.[1, 2]

Principle of the Test

The reaction in this test is dependent upon two physiological factors: (1) sexually mature female rabbits (unlike most mammals) normally ovulate only after receiving a stimulus, either from actual copulation or from being hopped by another female, and (2) the blood serum of pregnant mares contains a gonad-stimulating hormone in sufficient concentration (from the 45th to 90th days after breeding) to produce ovulation in isolated does when injected intravenously.

Outline of Technic

1. Select well developed virgin does at least three months of age and place them in strict isolation (away from both males and females) for at least two weeks before using them for a test. The white breeds are preferable since their conspicuous marginal ear veins make intravenous injections somewhat easier than in the colored breeds.

2. At some time between the 45th and 90th days after breeding the mare, cleanse the jugular region by wiping with a piece of cotton saturated in 70% alcohol and draw three or four ounces of blood from the vein by puncturing it with a 14-gauge, hypodermic, bleeding needle. The sample may be collected in an ordinary bottle which has been sterilized by boiling. The addition of a preservative is unnecessary. Since the hormone is apparently most concentrated during the period extending from the 60th to the 80th day after service, it is desirable for the container to bear a label stating the date of breeding and date of bleeding the mare in order that the diagnostician may know how much serum to inject into the rabbit for a reliable test.

3. Allow the blood to coagulate and the serum to separate from the clot. This process may be hastened by breaking the clot from the walls of the container. Since the hormone remains active in unpreserved serum for several days, samples may be sent for long distances for testing or be stored in a cool place until it is convenient to make the test.

4. Place the rabbit on the operating table, shave the ears, and apply 70% alcohol as an antiseptic.

5. Attach a 22-gauge hypodermic needle to a clean 5cc glass syringe and carefully draw 5cc of the clear serum from the container.

6. Face the rabbit and grasp one ear between the thumb and index finger of the left hand. Grasp the filled syringe so that the barrel rests easily in the right hand with the hub of the needle between the thumb and index finger. Carefully insert the needle into the most conspicuous vein and slowly inject the serum. A flashlight may be laid on the table and the ear held over it in such a manner that light passes up through, making the veins more easily seen. The quantity of serum injected varies with the period of gestation. Five cubic centimeters of serum drawn between the 50th and 85th day after breeding, is suffi-

[*] Journal Article 286 N.S. from Michigan Agricultural Experiment Station.

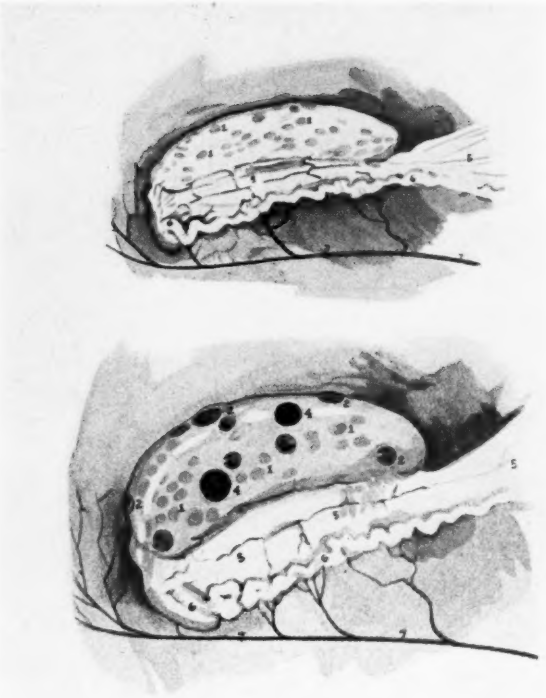
[1] Arnold, John J., 1936. Results of a Rabbit Ovulation Test for Equine Pregnancy, Preliminary Report; *North American Vet.*, 17:2 pp. 23-25. Michigan Agric. Exp. Sta. *Quarterly Bulletin*, 18:1, pp. 46-48, Aug. 1935.

[2] Arnold, John J., 1936. The Rabbit Ovulation Test for Equine Pregnancy, Fort Dodge Biochemic Review, Fall Number 8:1 p. 5.

PLATE I

Figure 1. *The negative immature rabbit ovary* is a small flat yellowish-pink body about one-quarter of an inch wide and an inch long. Numerous small pink translucent immature Graafian follicles (1) on its surface give it a characteristic mottled appearance. No other bodies are present in the normal ovary.

Figure 3. The *negative mature rabbit ovary* is about three-eighths of an inch in diameter and an inch and one-quarter long. It is usually cylindrical in shape and yellowish in color. In addition to the immature (1) and mature (2) Graafian follicles, fairly large dark red or black bodies (4) are occasionally seen. These are probably old hemorrhagic follicles and are of no importance in reading a test.



EXPLANATION OF

1. Immature Graafian follicle.
2. Mature Graafian follicle.
3. Corpus hemorrhagicum (ruptured follicle).
4. Hemorrhagic follicle.

A positive diagnosis can be made only after finding at least one corpus hemorr hagic has occurred within the past few hours. A small hand magnifying lens may be of

TE I

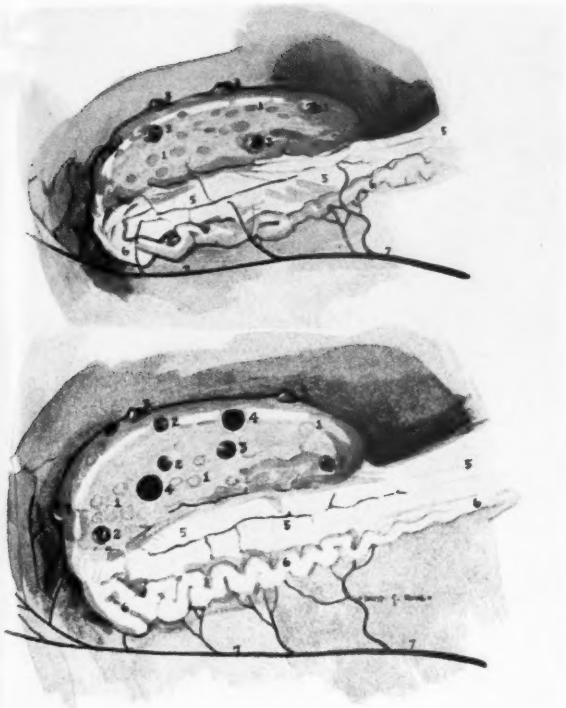


Figure 2. *The positive immature rabbit ovary* is somewhat larger, more congested, and presents from 1 to 6 corpora hemorrhagica. *This corpus hemorrhagicum* (3) *is a small bright red conical elevation about 2 millimeters in diameter with a very small pit-like depression in the center which develops as a result of the rupture of a mature follicle.* Unruptured mature Graafian follicles (2) may also be present but are paler in color, more translucent, have no pit-like depression, and are rounded rather than conical in shape. These unruptured follicles are of no diagnostic significance.

Figure 4. The *positive mature rabbit ovary* is quite similar to the negative ovary except for the presence of corpora hemorrhagica (3).

ION OF PLATE I

5. Ovarian ligament.
6. Fallopian tube.
7. Ovarian artery.

morr *hagicum on one of the ovaries.* This is the only positive evidence that ovulation may be of value in examining the rabbit ovaries but is not absolutely essential.

cient; but larger quantities are probably necessary for reliable tests before and after this period. *The blood serum must be given intravenously.*

Fatal anaphylactic shock usually follows the injection of large quantities of serum to rabbits that have been sensitized by previous injections. This may usually be prevented by injecting 1cc of a 1:10,000 solution of epinephrin intravenously immediately before giving the serum.

7. Place a small scalpel, a blunt-pointed bistoury, two pairs of plain forceps, a pair of rat-tooth forceps, a pair of scissors, two hemostatic forceps, two small curved suture needles, and a pair of needle forceps in a white enamelware pan and sterilize by boiling for five to ten minutes in water containing 2% borate or carbonate of soda.

8. Eighteen to 48 hours after injecting the serum anesthetize the rabbit with ether or give pentobarbital sodium intravenously at the rate of approximately 1.5 grains per five pounds body weight.

9. After complete anesthesia has been induced, restrain the rabbit in the dorso-recumbent position, clip the fur from the abdominal region, apply tincture of iodine to the operative area and make a one-inch midline abdominal incision about an inch anterior to the pubis.

10. With a pair of plain forceps held in each hand, pick up one of the uterine horns, trace it forward to the Fallopian tube, expose the ovary by gentle traction, and examine it carefully for the presence of new corpora hemorrhagica which show that the rabbit has ovulated (Figs. 2 and 4), indicating that the mare is in foal. If no corpora hemorrhagica are found (Figs. 1 and 3), examine the opposite ovary in exactly the same manner.

11. Return the uterine horn and ovary to the abdominal cavity and close the incision with fine catgut sutures which will usually dissolve as healing occurs. Allow the rabbit two weeks for recovery before subjecting it to a second test. Rabbits may be used until poor healing or adhesions terminate their usefulness.

Practical Applications of the Test

Several conditions may arise in which this test is of great value, both to the veterinarian and the horseman.

A definite statement that a mare is pregnant may increase her value greatly at private or public sale. Mares that do not come in heat after service are usually considered to be in foal. If a negative test is obtained from such a mare, the veterinarian can employ means of bringing her into estrum so that she can be bred before the close of the breeding season. On the other hand, some mares come in heat after conception. A positive test in a case of this kind saves the veterinarian the embarrassment of treating a pregnant mare for sterility.

Many good mares are shipped long distances for the services of a stallion and are left at the breeding establishment until they are known to be in foal. A positive test as early as the 45th day after service makes it possible for these mares to be sent home sooner than otherwise.

Tests on a number of mares early in the breeding season indicate the fertility of an untried stallion.

As a rule, pregnant mares are given better care and used for lighter work than barren ones. Therefore, the knowledge that a mare is or is not in foal is very important to the horseman in caring for brood mares.

Some buyers will pay more for a mare if they can be certain that she is not in foal, since pregnant mares are not suitable for running and harness racing, pulling contests, logging and other types of extremely heavy draft work.

This test might be of considerable value to pharmaceutical houses that use pregnant mare urine or serum as a source of hormones.

The test might be used to determine if an early abortion had occurred. A positive test followed by a negative test (before 90 days after breeding) would prove that the mare had aborted. (It is probable that a positive test would be given for a few hours after abortion.)

The veterinarian who does not care to diagnose pregnancy manually or learn the

details of the rabbit ovulation test can easily send a blood sample to a laboratory for diagnosis by the rabbit ovulation method. Or he may inject the serum into the rabbit and examine the ovaries as the rabbit is dressed for meat 18 to 48 hours later. If he is not familiar with the test, he may preserve the ovaries and send them to a diagnostician for reading.

General Discussion

During the years 1934 and 1935 small quantities of serum were used in an attempt to determine the relative concentration of the gonad-stimulating hormone at different stages of gestation. This accounts for the low percentage of accuracy. During 1936, four to 10cc of serum were used for each test. The percentage of accuracy was 100%. During the entire three years only one test (No. 5 in the preliminary report[1]) was erroneous when the following recommendations were complied with:

1. Use sexually mature, isolated, virgin does as test animals.

No. of Test	Date of Last Breeding of Mare	Name of Mare	Breed of Mare	Age of Mare Yrs.	Time from Bleeding Mare to Injection of Rabbit	Time from Injection of Rabbit to Laparotomy Hrs.	Amount of Mare Serum Injected Into Rabbit CC	Ovulation Test: Days from Breeding to Bleeding, Services 1st	2nd	Last	Ovulation Test: Result of Test	Physical Examination: Days Since Breeding of Mare	Physical Examination: Result of Examination	Days from Last Breeding to Foaling	Sex of Foal
	1935														
34	4-18	Belle Phoenix	Belg.	10	2 hrs.	47	2.0	44		44	—			324	F
35	4-18	Belle Phoenix	Belg.	10	6 hrs.	20	2.5	51		51	+			324	F
36	5-29	Calista de Rubis	Belg.	3	48 hrs.	24	2.0	92	71	71	+	196	+	338	M
37	5-29	Calista de Rubis	Belg.	3	7 days	24	2.5	103	82	82	+	196	+	338	M
38	5-29	Calista de Rubis	Belg.	3	2 hrs.	24	1.0	107	86	86	—	196	+	338	M
39	4-17	Colo	Perch.	8	1 hr.	49	2.0	45		45	—	238	+	341	F
40	4-17	Colo	Perch.	8	2 hrs.	24	3.0	74		74	+	238	+	341	F
41	4-15	Coro	Perch.	7	1 hr.	48	2.0	51	47	47	+	240	+	336	F
42	6-22	Jewrell de Wolfe	Belg.	4	3 days	24	2.5	76		76	+			180	M
43	6-22	Jewrell de Wolfe	Belg.	4	7 days	48	1.75	87		87	+			180	M
44	6-28	Leina	Perch.	6	35 days	24	1.0	100	80	63	+	167	+	342	M
45	6-28	Leina	Perch.	6	29 days	24	1.0	106	86	69	+	167	+	342	M
46	6-28	Leina	Perch.	6	25 days	24	1.0	110	90	73	+	167	+	342	M
47	6-28	Leina	Perch.	6	27 days	24	1.0	114	94	77	—	167	+	342	M
48	6- 4	Loet	Perch.	3	29 days	24	1.0	118	93	93	+	192	+	345	F
49	6- 4	Loet	Perch.	3	29 days	24	1.0	120	95	95	—	192	+	345	F
50	3- 8	Phovenche	Belg.	10	2 hrs.	22	2.0	59	57	57	+			225	M
51	6-24	Suzette	Arab.	13	17 days	24	1.5	56		56	+			336	M
52	5-24	Winnie de Rubis	Belg.	3	11 days	24	2.0	76		76	+	201	+	337	M
53	5-24	Winnie de Rubis	Belg.	3	7 days	24	2.5	87		87	+	201	+	337	M
54	5-24	Winnie de Rubis	Belg.	3	9 days	48	1.0	89		89	+	201	+	337	M
55	5-24	Winnie de Rubis	Belg.	3	5 days	24	1.0	93		93	—	201	+	337	M
	1936														
56	5- 8	Alice	Perch.	9	27 hrs.	23	5.0	68		45	—	Rebred			
57	3-19	Belle Phoenix	Belg.	11	1 hr.	33	5.0	70		70	—	Rebred			
58	3-19	Belle Phoenix	Belg.	11	1 hr.	33	5.0*	70		70	—	Rebred			
59	4-24	Claude Laet	Perch.	3	25 hrs.	25	6.0	90	87	87	+	247	+	342	F
60	3-20	Colet	Perch.	5	25 hrs.	24	5.0	87		87	+	247	+	345	F
61	3-20	Colet	Perch.	5	1 hr.	32	6.0	71		71	+	273	+	345	F
62	3-20	Colet	Perch.	5	13 days	25	4.0	79		79	+	273	+	345	F
63	7-29	Coreen	Perch.	22	14 hrs.	30	10.0			128	—		—		
64	4-24	Etola	Perch.	6	15 days	33	5.0	79		79	+	273	+	345	M
65	4- 6	Jem	Perch.	10	30 hrs.	22	5.0	69		69	—	Rebred			
66	4-24	June de Furnes	Belg.	8	4 days	24	5.0	91		91	—	243	—		
67	5- 6	Maude	Belg.	13	4 days	24	5.5	77		77	+	231	+		

2. Bleed mares between the 45th and 90th days after service.

3. Use at least 5cc of serum injected into the rabbit intravenously.

4. Examine the rabbit ovaries 18 to 48 hours later.

Conclusion

The rabbit ovulation test for equine pregnancy is highly accurate and reliable when properly conducted.

Acknowledgment

This work was carried out under the direction of Prof. R. S. Hudson, Superintendent of the Farm and Horse Department, Michigan State College, and Dr. Ward Giltner, Dean of Veterinary Science and Head of the Department of Bacteriology and Hygiene. Dr. John P. Hutton, Professor of Veterinary Medicine, Surgery, and Clinic, contributed the data pertaining to the diagnosis of pregnancy by physical examination. Alvin Wingerter, a senior veterinary student, also gave a great deal of assistance with this work.

Intrauterine Location of Bull and Heifer Calves

Many cattle raisers believe that fetal bull calves are carried in the left horn of the uterus, and heifer calves in the right horn. The following data were collected in an effort to determine the accuracy of this belief.

Using 1027 known pregnancies as 100%, there were 504 (49%) male and 523 (51%) female calves. Of the male calves, 218 (21%) were gestated in the left horn of the uterus, while 286 (28%) were gestated in the right uterine horn; 190 (19%) of the female calves were gestated in the left horn of the uterus, while 333 (32%) were gestated in the right horn of the uterus.

From these data one might conclude that more calves of both sexes are borne in the right than in the left horn of the uterus, with a higher percentage of female than of male fetuses being gestated in the right horn.

These data were gathered from the records of Dr. Claude H. Case of Akron, Ohio, and represent some of the results of diagnosis of pregnancies per rectum in dairy cows from 32 different herds during the years 1934, 1935 and 1936. Although the possibility of error in individual cases is considerable and obvious, it is felt that most mistakes have counterbalanced each other.

WESLEY O. KEEFER.

Columbus, Ohio.

In applying the turberculin test, a clean caudal fold before injection helps to determine the diagnosis in reacting cattle.—*W. B. Redman.*

The Food of Sunshine

We often forget that all grains, feed and forage and all the things that support animal life are but stored sunshine. Generally speaking, this storing takes place through the activity of plant life. Of late it has been definitely proved that sunshine is necessary to animals as well as certain vitamine-carrying foods for the correction of certain nutritional conditions, such as rickets and anemia. It is now generally believed that the animal body is capable of absorbing the light rays direct from the sun and manufacturing them into complex body-stored substances much the same as does plant life.

In many districts, during the winter months, we have little sunshine, but the light rays are capable of passing through thin clouds, and upon days that are partly clear, much good may be derived from outside exposure of animals on the sheltered side of buildings. We should build our farm buildings with the thought of utilizing sunshine. The slanting rays of mid-winter will beam under roofed buildings having an open southerly exposure. We must not use ordinary window glass because the violet rays, which are most beneficial, will not pass through. By painting white or whitewashing the inside of the building or applying white sand over glue-treated walls, we can add greatly to the sun reflecting surface of the walls.

W. H. LYTLE.

Salem, Oregon.

Vitamins and Distemper

V. Exposure and Inoculation of Puppies of Known Nutritional History

By W. O. FROHRING,
Cleveland, Ohio

Exposure in a Distemper Ward.—However useful injecting the infectious agent into experimental animals may be in studies, the fact remains that this is an artificial method of producing a disease. In the kennels, distemper appears to occur spontaneously, or following exposure to animals having the disease. Hence, direct exposure in a distemper ward in which there were 20 to 35 dogs suffering from various forms of distemper, would appear a useful method of obtaining data as to the relationship of nutrition to resistance against the various pathologic conditions considered under the heading of distemper.

A realization of the complexity of the problem of attempting to expose puppies in various stages and degrees of deficiency of the several vitamins known to be necessary to the dog, and the additional complications of multiple deficiencies, suggested the preliminary and more simple procedure of attempting to rule out all vitamin deficiencies before the puppies were exposed to other dogs with distemper. An attempt was made to build up the reserves of vitamin A and the entire vitamin B complex in the puppies before transferring them to the distemper ward. Some received complete synthetic diets, but most of them were fed dry commercial dog foods of reputable manufacturers. To supply the vitamins, a concentrate of carotene in oil was added as a source of vitamin A, and dried yeast, in the form of bakers' or brewers' yeast or both, as a source of the vitamin B complex. A small quantity of irradiated yeast was given to some of the puppies as a source of vitamin D.

MORE than 150 puppies were used in this experiment. Approximately 15 dogs were used as controls,—that is, they did not receive the vitamin supplement in their diet. A large proportion of these animals became ill and displayed some of the characteristic signs of distemper.

The results in the animals that received supplementary vitamins yielded clear indications of the importance of nutritional factors and the probable protective effect of eliminating nutritional deficiencies before the puppy is exposed to distemper. The best results were obtained when carotene in oil and dried yeast were administered liberally as a supplement for a period of 60 to 90 days. During this period not only vitamin deficiencies were corrected, but probably the animals' tissue reserves were maintained at a high level.

THE impression was obtained that in a very large proportion of cases diagnosed as distemper, the organisms involved (if any) are of a character that they are not normally pathogenic or virulent. Only because of the poor nutritional condition of the host do they produce a pathologic condition. If this is true, it might help to explain the difficulties in attempting to determine a specific organism as responsible for the disease. With the lowered resistance of the host, the most virulent organism present might result in an infection. The observations throughout this entire study, suggest that probably many of the difficulties attributed to "distemper" are due directly or indirectly to nutritional deficiencies, and may consequently be prevented.

Studies with the Commercial Virus of Distemper.—In about twenty-five instances, an attempt was made to use the commercial virus of distemper as an infecting agent. Since the number of dogs studied from this standpoint was small, no attempt was

made to produce a standard distemper virus, but rather to employ fresh commercial virus such as is used in the usual Duncan-Laidlaw method of immunization. In this method, vaccine is first given and later the living virus. The theory involved is that the vaccine protects against the virus and a mild case of distemper develops, which produces a lasting immunity. From the printed precautions furnished with the commercial living virus, one would conclude that the producers have considerable confidence in the ability of the virus to initiate the disease.

Yet, of the 25 puppies inoculated, only one contracted distemper. This puppy had been exposed in a distemper ward for two weeks without any apparent change, but exhibited the disease a few days after the virus was injected. In this case, one could not, of course, be certain that the disease came from the virus rather than from exposure in the distemper ward.

CHARACTERISTIC temperature charts are shown in figures 36 and 37. These show that in all the other cases, there was no significant rise in temperature, nor did the animals have any appearance of illness. They also ate well throughout the test period. One of the controls (I-1) that had received a commercial dog biscuit with a small amount of milk, but without vitamin supplements, did show a rise in temperature to 103.5°F. on the fourth day after the virus was injected. Experience in taking the temperatures regularly in hundreds of puppies, used in these various tests, suggests that the temperatures of puppies in apparently good health vary considerably and a temperature of 103.5°F. for one day may not be at all significant.

One might at first attempt to explain the inability of the virus to produce the disease on the basis that the puppies were naturally immune. However, when these same puppies were exposed later in the distemper ward, most of those on a diet that was not supplemented with vitamins became sick, and in the case of the control puppy (I-1) just mentioned, death occurred eight days after it was placed in the distemper ward. This dog had received only commercial dog food without any vitamin supplements. It also happened that the previous owner kept one of the puppies of this particular litter. A month after the remainder of the litter was placed on controlled diets, I asked him for permission to weigh and examine the one he had kept, in order to compare it with the weight and general condition of its litter mates. He reported that it had died of distemper three weeks after I had received the other puppies. This suggests, at least, that one puppy in that litter was not naturally immune to the disease.

THESE results in the use of the virus are not reported with the thought that they prove or disprove anything conclusively.[1] The number of puppies used is, of course, entirely too small. The great difficulty in obtaining puppies and the fact that apparently more useful and significant results were obtained in the other studies herein reported, made it impossible to continue these experiments at this time. It is hoped that a much larger number may be included in the next series of studies of this type.

Laidlaw and Duncan, in their careful and painstaking studies of dog distemper from the strictly bacteriologic standpoint, reported their difficulties in obtaining susceptible puppies for these studies. Was the variation in the susceptibility of the puppies in any way related to the adequacy or inadequacy of the diet? A repetition of some of their work, using puppies on controlled diets, might prove interesting.

Figures 36 and 37 show the course of events in three groups of dogs. Litter I contained 10 mongrel spaniels. One of the dogs was retained by the owner and the other nine were sent to me for these studies.

[1] Although we think it unnecessary for those who have read all preceding installments of the series, it may be well to point out to others that it was no part of the objective of this experiment to investigate the soundness of the Laidlaw-Dunkin method of immunizing dogs against distemper, or the sufficiency of commercial canine distemper virus. The author draws no conclusions nor makes interferences in either of these matters. They are outside the scope of the experiment.

Puppy I-1 was the negative control. At the point marked *A* on figure 36, commercial distemper virus was injected intramuscularly. There was a slight rise in temperature at the end of the fourth day, but no more than had been observed previously in normal puppies exhibiting no signs of infection. At *B*, the puppy was transferred to the distemper ward, after which there was a gradual rise in temperature. At the end of eight days in the distemper ward, the puppy died, although one could not say that he exhibited the classical symptoms of distemper.

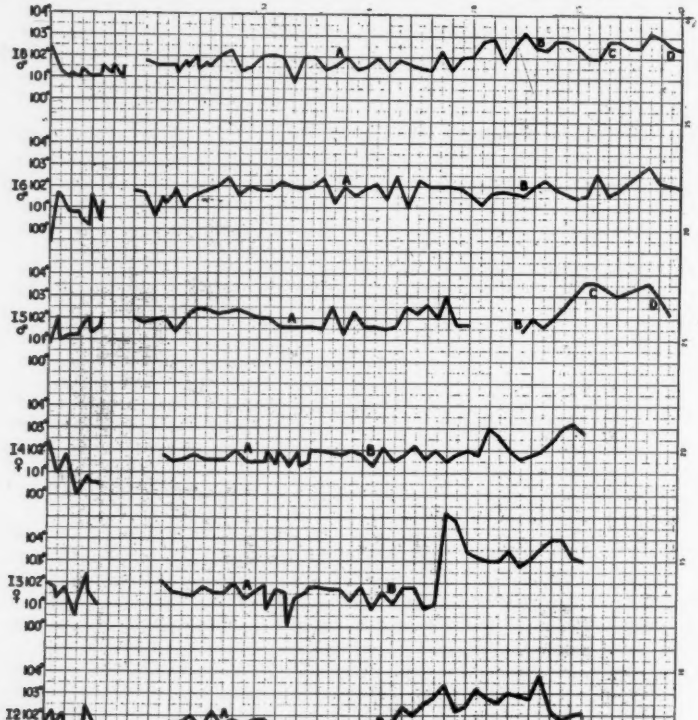


Fig. 36. Temperature charts on puppies mentioned in the text

Puppy I-2 received the same commercial dog biscuit as puppy I-1, but this was supplemented with dried yeast and carotene in oil. At *A*, the entire contents of a vial of commercial virus was administered intradermally. There was no significant rise in temperature. The puppy was kept in isolation for 16 days and at *B*, was transferred to the distemper ward. The puppy showed a slight rise in temperature for several days with a cough. The animal ate well and did not die, and returned to the laboratory in apparently good condition. It was then given away and a month later was reported to be in excellent condition.

Puppy I-3 was given the same commer-

cial dog biscuit supplemented with yeast and carotene. At the point marked *A* one vial of fresh commercial distemper virus was administered intradermally. From then, until it was exposed in a distemper ward two weeks later (at *B*) it received liberal quantities of carotene and of yeast. At the end of the sixth day in the distemper ward, the puppy exhibited a marked rise in temperature and did not eat well for several days. At the end of the experiment the puppy was eating well and appeared normal, although the temperature was still above normal. Because of shortage of space in the laboratory, it was necessary to destroy the animal at this point and hence no conclusive report on the outcome can be made in this instance.

Puppy I-4 also received commercial dog biscuit supplemented with yeast and carotene in oil. At *A*, fresh commercial virus was given intradermally. Nine days later, at *B*, the puppy was transferred to the distemper ward. It displayed no significant change in the temperature curve until several days later when there was some anorexia, but within two days the appetite had returned to normal. While additional temperature records were not kept on this puppy, it was placed where it could be observed for a period of two weeks, during which time it was apparently perfectly normal and showed no evidence of infectious disease.

Puppy I-5 also ate the commercial dog biscuit supplemented with yeast and carotene. At *A*, it received virus. At *B*, the puppy was transferred to the distemper ward. At *C*, a severe cough developed which disappeared at the point marked *D*. Otherwise the animal appeared to be normal, and observation for an additional period of two weeks revealed no change in this condition.

Puppy I-6 was fed the commercial dog biscuit with a little milk until, at *A*, the entire contents of a vial of commercial distemper virus was instilled into the nostrils, putting about half of the contents of the bottle in each nostril. After this, for 21 days, the puppy received liberal quantities of carotene and yeast, and at *B*, was transferred to the distemper ward. It ate well during the entire period. It was kept under observation for three weeks, during which time it appeared perfectly normal.

Puppy I-8 received the commercial dog biscuit. This was supplemented with yeast and carotene in oil for a period of two weeks. Then 1cc of a filtrate of the nasal discharge of a puppy with the respiratory type of distemper was administered. There was no significant change in temperature following this procedure and 21 days later, at *A*, the entire contents of a vial of fresh commercial virus was given subcutaneously. There was a slight increase in temperature following this, although the puppy appeared well. At *B*, it was transferred to the distemper ward and at *C*, a slight cough developed, which disappeared at *D*. This puppy was kept under observation two weeks longer and appeared normal throughout the entire period.

Puppy I-9 was the last of this large litter. It received commercial dog biscuit supplemented with carotene and yeast. From the same nasal discharge used on puppy I-8, a 24-hour culture (on blood serum agar) was made and rubbed into the nostrils of puppy I-9. Commercial virus was instilled into the nostrils at *A* and at *B*, the puppy was transferred to the distemper ward. At *C*, slight anorexia appeared for about two days, but on the following day the appetite returned to normal. The dog was kept under observation for about 10 days, during which time it remained perfectly normal.

Puppies 377 and 378 had been on a synthetic diet and were about eleven months old. They were included in this particular series in order to study the effect of distemper virus on dogs that were practically fully grown, and of which nutritional history was known. These two puppies were received when they were newly weaned and were used for vitamin A tests. Both were depleted of vitamin A at one time and then received curative doses of vitamin A in the form of carotene in oil. At the time they were inoculated with the virus and later exposed in a distemper ward, some time had elapsed since vitamin A depletion

and cure. Their diets had been complete in all respects at all times except during the period of vitamin depletion. They were both in a good nutritional state at the time the virus was administered.

Puppy 378 had received synthetic bitches' milk supplemented with yeast and carotene in oil and a little boiled polished rice, for a period of about three months. At *A*, a vial of fresh commercial distemper virus was given subcutaneously. The animal remained in excellent health. This dog was not transferred to the distemper ward, but was destroyed at the end of the period shown on the temperature chart, in order to determine the vitamin A content of the liver in connection with another experiment.

Puppy 377 was a litter mate of 378 and also had been raised on the synthetic diet supplemented with yeast and carotene. At *A*, the entire contents of a vial of fresh commercial virus was instilled into one nostril and a sterile cotton pack inserted for about one hour. No significant change in temperature followed. At *B*, the dog was transferred to the distemper ward of the veterinary hospital. Unfortunately the temperature records were mislaid from this point on, but the attendant assured me

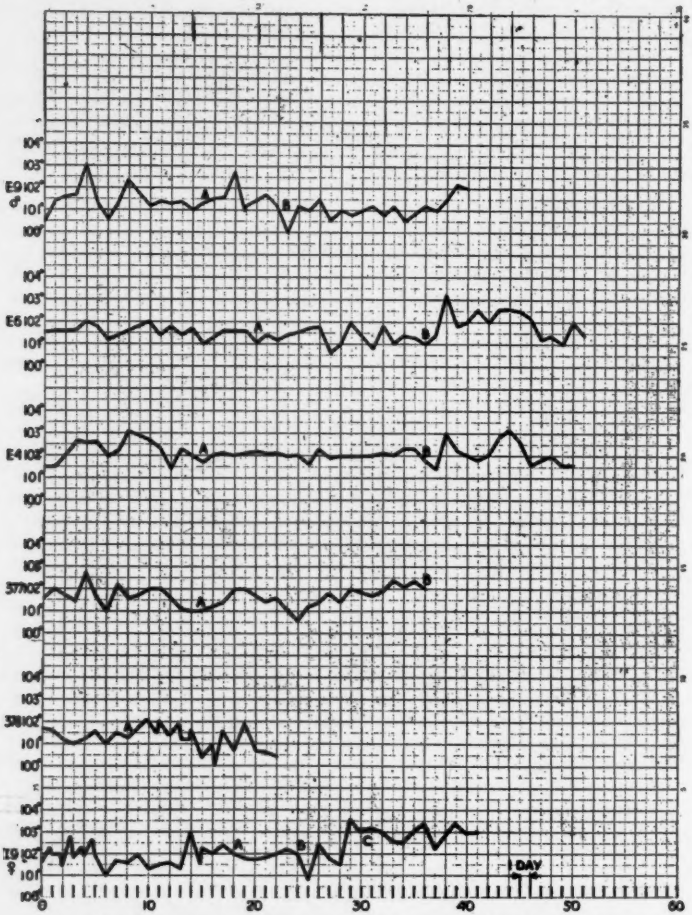


Fig. 37. Temperature charts on puppies mentioned in the text

that not only was the puppy perfectly normal throughout the four weeks' period in the distemper ward, but the temperature was normal throughout this time.

Puppy E-4 was another that had received a synthetic diet supplemented with carotene and yeast. This puppy had been used in a previous experiment to determine the curative dose of vitamin A, and had been depleted at one time, and later cured, after restoration of vitamin A to the diet in large quantities (about 25,000 U.S.P. units daily). The dog was in a good state of nutrition at *A*, when it received the entire contents of one vial of fresh commercial distemper virus in one nostril. At *B* the dog was transferred to the distemper ward, and while it showed a slight fluctuation in temperature, it ate well and did not appear abnormal in any way. This puppy was kept under observation for a period of two months after exposure and at no time exhibited any abnormal symptoms.

Puppy E-6 had been used as a positive control in the previous series of experiments, and hence had never been depleted of vitamin A. It had been receiving about 5,000 U.S.P. units of vitamin A daily. This, together with yeast, had supplemented a synthetic diet. At *A*, the entire contents of a vial of fresh commercial distemper virus were injected intradermally. At *B*, the dog was transferred to the distemper ward. The temperature chart displayed a slight rise several days later, the puppy ate well at all times and did not appear abnormal. It was under observation for a year after exposure and had no infection.

Puppy E-9 had also been raised on a synthetic diet supplemented with carotene in oil and yeast, except for a short period when it was deprived of vitamin A to the point where growth ceased and xerophthalmia appeared. Liberal curative doses (25,000 U.S.P. units daily) were given for a period of 30 days before this experiment. Apparently the large quantity of carotene in oil given subsequent to the depletion period was sufficient to protect this puppy to the same extent as the others that had never had any vitamin deficiency. At *A*, a vial of virus was instilled into the nostril, and at *B*, the puppy was transferred to a distemper ward. It was observed for four months and at no time displayed any infectious disease.

EDITOR'S NOTE—This is the fifth of a series of six articles on Vitamins and Distemper, by the same author. The sixth installment of this important discussion will appear in an early issue.

* * * *

Cryptorchid Operation for Hermaphrodites

A man came into my small animal hospital today and said: "Hello, Doc. Are you the same Doctor Wolf that used to be at Marysville, Missouri?" I said "Yes, that is right." "Well," he said, "when I was 12 years old, I saw you operate on a hermaphrodite mule at Pickering, Missouri." This was over 30 years ago, so I will pass it along.

I had just finished castrating some 50 head of mules (nothing unusual in those days in Missouri) for a Mr. Joe Alexander when he said: "Now, boys, bring out that outlaw and everybody watch your step." Three men came out of the farm with a beautiful three-year-old that looked to be a show, mare mule. She would mount anything from a cow to a stake and rider fence. Joe said: "There she is, Doc. Put her down and see if you can find any testicles. Bring out her kidneys or anything else you find."

My modis operandi was the same as for the operation on a double crytorchid, except the incision was made above the udder; there being no scrotum. The testes were round and rather solid, as compared to the soft, flabby ones usual in cryptorchids.

Several years later I located at Champaign, Illinois, and related my experience to Dr. D. A. Cahill of Monticello. The following spring Doctor Cahill called me to one of his clients and on my arrival, three or four men brought out a big fine-looking animal, with ropes on it three ways, having the appearance of a normal mare, three years old and weighing about 1700 pounds. She was plenty crazy, tried to straddle the back of by car—a beautiful hermaphrodite. I operated on her as on the mule. Both cases made splendid and useful work animals.

Los Angeles, Calif. H. H. WOLF.

Drugs Used in Veterinary Medicine

II. Silver

By VICTOR LEWITUS, New York
Instructor in Materia Medica, Columbia University College of Pharmacy, Associate Professor in Materia Medica, First Institute of Podiatry

Historical Sketch

THE history of silver is as old as civilization itself; for next to gold, it is considered the forerunner of almost all the other metals. It appears that the alchemists had difficulty in separating the precious metals from one another, and for this reason the metal under consideration was most often used in alloy form. As early as the thirteenth century before Christ, the Egyptians were known to have employed the metal; though, at that time it was even more rare than gold. The Bible hints of its use as a medium of exchange long before it had been made into coins. The Phoenicians found it in such abundance upon reaching Spain, that they weighted down their wooden anchors with it instead of the lowly lead. And on this side of the ocean, the Peruvian Indians to this day employ ornaments as well as vessels and utensils made of the native metal. Silver has always been associated with luna —the moon—in ancient mythology probably because of its color and lustre; and it is a commonplace to use the term "silvery moon". Who has not heard of "lunar caustic"—a term which immortalizes this concept? The ancient Greeks and Romans do not appear to have applied silver therapeutically, but Avicenna of the Arabian school mentions its medicinal use. It appears to have been employed in the form of oxide and nitrate internally in the treatment of epilepsy and other nervous ailments as well as a purge, and until very recent times its use in the treatment of epileptics persisted. It is still used internally in present-day human medicine in the form of nitrate in cases of hpyerchlorhydria and as an astringent for ulcerations. Its use in veterinary medicine, however, is limited to external or topical applications; though there are some who employ it as mentioned above, for gastro-intestinal conditions.

Preparations

Metallic Silver.—Unlike most other metals, except copper, silver has long been known for its bacteridical power. It has been demonstrated *in vitro* as well as *in vivo*, that silver foil placed over colonies of streptococus in petri dishes or on an infected area will promptly destroy the organisms. For this reason there is limited use for such methods where foil-dressings are applied. For the most part, however, the collodial forms of the metal seem to be held in greater favor because of the surface phenomena involved.

Silver Nitrate ($AgNO_3$). — Colorless plate-like or rhombic crystals, sensitive to light and organic matter, changing to a grayish-black color on exposure, of bitter metallic taste, odorless, readily soluble in water (1 part in 0.4) and alcohol (1 in 30); incompatible with the soluble chlorides, bromides, iodides (with which it forms insoluble silver chloride, etc.) and also the soluble carbonates and hydroxides (forming the silver oxide) and with almost all organic drugs and matter, and reducing agents.

Silver nitrate is an efficient antiseptic (even in a solution 1:10,000) and germicide (1:1000). Its great disadvantage lies in its irritant effect upon animal tissues. It is distinctly astringent both on denuded areas as well as on mucous membranes. Strong concentrations are distinctly caustic. Used in this way, it delimits its own action and thus its effects are only superficial. It is used for stimulating the healing of wounds, indolent ulcers and exuberant granulations. It is also applied, well diluted with distilled water, to correct catarrhal infections of the mucous membranes. For the treatment of conjunctivitis and of corneal ulcers strengths up to 1% may be used. In case the animal registers discomfort from

the irritation, a weak solution of sodium chloride, immediately instilled, arrests this effect. Repeated treatment with this drug should be avoided since it causes a local permanent discoloration known as argyria. The eye then assumes a dark color. In urethritis and cystitis, silver nitrate may be used in a range of 1:10,000 to 1:5000 strength; and for enemata it is diluted down to 1:100,000. Whenever silver nitrate is to be applied, the surface should be prepared by removing any excess mucus, pus or exudation which might interfere with its activity. Stains caused on the site of application may be removed by means of dilute sodium thiosulphate or ammonium hydroxide solutions—but these must be applied while the discoloration is still fresh. Some practitioners follow the silver nitrate applications to ulcers, for example, by a follow-up treatment with tincture of iodine to permit the formation of silver iodide within the tissues. Whether or not this is acceptable practice is still undecided in the writer's experience.

Lunar Caustic—or toughened silver nitrate (argenti nitras induratus) U.S.P. XI. is another form of silver nitrate that is official. It is silver nitrate prepared as moulded pencils or cones by the addition of a small proportion of silver chloride. This is the form employed for its caustic or escharotic effect. It must be moistened with sterile distilled water before use, and should be held in a forceps or attached to a probe to avoid staining of the hands. Silver nitrate should not be mixed with phenol, cresol, creosote or related substances since it is an oxidizer and may cause an explosion. If it is given internally, it is made into a pill with kaolin and used in following doses:

H & C: grains v-x (.3 -.6 gms)
Sh. & Sw. grains i-ii (.06-.13 gms)
D grains ⅛-½ (.008-.03 gms)

Other Silver Salts.—There are a number of the simpler silver salts used mainly for their antiseptic or germicidal properties which are unofficial. They include silver citrate, silver lactate and silver picrate.

Silver citrate is relatively non-irritant. Its use as a dusting powder has been suggested. In solutions ranging from 1:40,000 to 1:10,000, it is especially recommended for urethral injections or for injection into other body cavities.

Silver lactate is suggested in strengths of 1:2000 to 1:1000.

Silver picrate offers promise in the treatment of stubborn trichomonad infections such as those of the vaginal preputial tracts. The drug is marketed in 1% strength dispersed in powdered koalin and is administered by measured dose as an insufflation. Two insufflations, a week apart, have thus far given positive results in humans. Each application to the genital tract consisted of five grams of the powder. Though there have been no reports from the veterinary field, there is no reason why parallel results should not be obtained in both large and small animal practice. The dose, of course, must be proportionately regulated since the toxicity approaches that of silver nitrate, though, it is said to be much less irritant. It is not specific for the protozoa but is very effective. A combination treatment of insufflation followed by suppository (containing 2 grains of active ingredient) each day for six days, interrupted by the second insufflation and then again followed by 6-day suppository treatment, has been found to be an ideal method.

Colloidal Silver Preparations.—Silver nitrate and its near-relatives are used much for their germicidal or antiseptic effects. Since this treatment is often complicated by marked irritation, pain, astringency and corrosion, it has been found necessary to use silver-colloid preparations as substitutes. This group of compounds has the following advantages over the first-mentioned:

1. Excessive irritation is avoided.
2. Reduced irritation permits more frequent application; thus, securing a more continuous action.
3. The absence of coagulum formation on abraded areas facilitates deeper penetration of the colloid itself.
4. The reactive power is greater.

The metallic and insoluble compounds of silver (such as the halogen salts and the oxide) as well as the protein-silver precipitates, may be brought into permanent sus-

pension as ultramicroscopic particles, known as colloids. In this condition they easily are miscible with water. Commercial preparations consist, for the most part, of solutions (of reduced silver or silver oxide or protein-silver precipitates) in an excess of denatured protein which has been dried in a vacuum. Most of them are slowly soluble in water and yield only small amounts of free silver ions so that they do not coagulate the tissue proteins readily.

The chief types of colloidal compounds used in medicine are represented by two that are officially recognized: strong silver protein (protargol) and mild silver protein (known under various trade names including argyrol). It is to be noted in passing, that the strong silver protein contains about 8% of silver, whereas the mild silver form contains from 19 to 25% of the metal. This is an apparent contradiction but in the case of these complex compounds the ionizable fraction is greater where there is less metallic content, and *vice versa.*

Strong Silver Protein (8% Silver).—A brown, odorless powder, hygroscopic; freely but slowly soluble in water (about 1:2) forming colloidal solutions, soluble in glycerine but amost insoluble in alcohol, chloroform and ether. It is best dissolved by sprinkling on top of distilled water and allowing it to settle spontaneously. It is incompatible with strong solutions of salts and also acids. Solutions should be freshly prepared and kept in amber bottles away from light. This drug is non-astringent and almost non-irritant. It is valuable in the treatment of inflammatory conditions of the mucous membranes and as an application to wounds and ulcers.

In the stick form (5% protargol) it is especially adapted for treating utero-vaginal diseases, wound sinuses, fistulas and retained after-birth. In ophthalmic cases, it is used in 0.5 to 4% strength in catarrhal conjunctivitis; and up to 10% in purulent forms, followed by irrigation with weaker solutions (0.25%) or boric acid. It may be also used in ointment form of 5 to 10%. In these cases it does not cause inflammation, nor opacity of the cornea. In spray form, it may be used in 2 to 10% strength for pharyngitis and laryngitis, or it may be swabbed on the inflamed areas. In simple inflammation of the womb, injections or irrigations of 2 to 5% may be used, to advantage, several times daily. In more severe cases, the stick form (5% protargol) may be inserted to counteract the purulent discharge. This allows slow penetration extending to the submucous areas, whereby healthy granulation and rapid healing are promoted.

In slight vaginitis, this drug is also useful; though, in severe infectious granular vaginitis a continuous treatment with the stick form is indicated. Here the treatment consists of washing the vestibule of the vagina with warm water, and then inserting two sticks, repeating this treatment every second day for about two to three weeks. If there is reason to believe that a bull is infected, cows should have two sticks inserted into the vagina two or three hours after service, to prevent infectious vaginitis. When the after-birth is retained after normal birth or abortion, from 3 to 10 sticks are inserted into the uterus, and repeated at daily intervals, if necessary. In these cases, the sticks inhibit putrefaction and prevent foul odors.

In urethritis and on mucous membranes, protargol is used in 0.25 to 2% strength. It is used on wounds in solution or diluted powdered form; and in treating sinuses and fistulas the stick form may be inserted into the opened tissue at intervals of a day or more until healing is complete. The drug promotes healthy granulation and cicatrization without much irritation or any caustic effects.

A new preparation of protargol and urea (the latter to increase solubility) has been placed on the market just recently.

Mild Silver Protein (19 to 25% Silver).—This is the argyrol-type of colloidal silver and includes the following non-official substances: argyn, cargentos, silvol and solargentum. These are quite non-irritant, much milder than even the strong silver proteins, and consist mainly of silver oxide protein colloids. Though less active as an antiseptic, this group is more soothing than the

stronger group. Since the solutions are of higher specific gravity, diffusion is facilitated and displacement of pus and secretions is more efficiently obtained. Solutions are employed similarly to those of the strong silver proteins, but the strengths may be considerably increased. In pharyngitis and laryngitis the preparation may be used in 5 to 30% strength; in various types of conjunctivitis in 5 to 30%, and in cystitis in 3 to 5% strength. As with the strong type, the danger of argyria occuring in the corneal region is ever present. This group of substances resembles the strong silver protein types closely in physical properties except that they are darker brown or almost black in color and thus make much darker solutions. The solubilities and incompatibilities are the same.

Collargol (78% silver).—This represents a separate type of protein-colloid of silver. It is commonly known as Crede's salt, and the high silver content has about 2% ionizable. It has been used for the violent reaction it induces in cases of pneumonia, bronchitis, septicemia, etc., as with nonspecific protein therapy; and also for the treatment of purpura in horses (2% solutions) but such intravenous medication has not warranted its continuation. The 15% ointment has been used as an inunction, for rubbing thoroughly in infected regions. It has also some use as a dusting powder (5%) in clay; in suppositories (3 grains each) and tampons (¾ grain each).

Neo-Silvol.—This protein compound of silver iodide (18 to 22%), even in concentrated solutions, does not cause irritation or coagulation of tissue proteins. Although it does not cause staining as is the case with other silver colloids, it may produce argyria (a slate-gray or bluish discoloration of the skin and deep tissues). This drug is used in the same manner as the others against infections of accessible mucous membranes such as the eye, ear, nose, throat and genito-urinary tract especially in the female.

In the eye neo-silvol may be used in 10 to 40% strength; in the ear, nose, throat, etc. in 5 to 40%; in sinusitis in 2 to 5%; in urethritis in 10 to 20%; and in the female genital tract in strengths from 10 to 50%. Solutions should be prepared by adding the solid to hot water. Solutions must be freshly prepared after a week since the metal gradually precipitates. They are not compatible with local anesthetics.

Lunosol is a preparation of colloidal silver chloride (10%) and sucrose (90%). As in the case of the previous drug, it is non-irritant and non-staining, and is similarly employed. For irrigating the bladder it is used in strengths of 0.1 to 1%; in the vagina as an irrigation in 1%; in the male urethra in from 3 to 25%; for rectal irrigation in 1 to 5%; and for applications to the eye, ear, nose, etc. in strengths up to 10%.

Toxicology

From the toxicologist's viewpoint, silver compounds present unusual problems. Locally, the soluble salts are distinctly caustic or escharotic but once they have coagulated the superficial tissue with which they have made contact, they become self-limiting in action. Of course, in the eye, blindness may follow due to corrosion. When swallowed by the animal, silver nitrate is changed to the insoluble chloride, and later to the albuminate and thus absorbed. Large doses of the nitrate cause gastro-enteritis followed by paralysis and convulsions in the animal. Intravenously, the silver preparations cause nervous symptoms to become prominent producing extensive motor paralysis. In mammals, small amounts ingested at a time are taken with impunity. In man, the worst symptom occurs in the discoloration of the skin. A case of a circus performer known as the "blue man" was brought to the writer's attention. The individual had been living with this abnormal hue to his skin for over 40 years, and at autopsy his body yielded over 103 grams of metallic silver! In animals the chief change occurs in the discoloration of the connective tissues internally. This is probably due to the hydrogen sulphide that occurs in the digestive tract or the reduction that takes place as part of the function of the living cells. When such animals are autopsied, a further darkening of the membranes may occur on exposure to light.

In case of excessive applications locally to the skin or the mucous membrane of the animal, such as in the eye; or if silver solutions of any type have been accidentally given to the animal, the best alexipharmic is sodium chloride or ordinary table salt solution. This should be applied locally, allowed to react for some time and then rinsed off. Internally, the animal should be drenched with large draughts of the fluid. Fresh staining can be treated with household ammonia well diluted or "hypo" solution (sodium thiosulphate) or even a 10% solution of potassium iodide. Chronic argyria cannot be treated efficiently.

* * * *

Endocrine Sterility

Obviously not without reason, much ado is made over so-called functional sterility in animal production which, more scientifically identified, is lack of pituitary-thyroidean-ovarian accord and which, in the light of our present knowledge, is the cause of reproductive interruptions in the absence of anything pathological in fact. It is, however, not amazing that female animals with perfectly healthy genital organs do not produce offspring with the clocklike precision expected of them, for, when the endocrine mechanism governing reproduction does not run smoothly without cessation, the production of young becomes an irregular event. Perhaps, nature knows best the ability of a female to pass unharmed through one depressing gestation after another and, therefore, checks reproduction beyond somatic tolerance through the fine workings of the endocrine system.

As Richard Chute (*J. A. M. A.*, Dec. 5, 1936) declares (for the human), "sterility varies from that which is complete and absolute to that which is relative or partial and amenable to treatment." We believe this remark applies equally to animal breeding so far as endocrine troubles are concerned, but whether it is proper to spur on another gestation by readjusting the endocrine balance with hormones when the uterus may not be capable of carrying its burden to a successful end—the birth of viable young—is another question. Reduced to practical terms, this means that when gestation is brought about by exciting the endocrine glands to action, something should be done to enable the uterus to complete the process. Perhaps, vitamin E given at intervals during gestation is a rational follow-up treatment to endocrine stimulation.

While endocrine sterility is an intricate subject as yet in the process of development, one may not with impunity expunge the known facts in animal production simply because miscellaneous gland therapy is admittedly unscientific in view of our present knowledge. When sterility is of endocrine origin, we have yet to find means of detecting which gland is defaulting and as a consequence we continue with polyhormone dosing in lieu of an exact diagnosis. Although the anterior pituitary, the thyroid and the ovary are the endocrine chain through which the uterus is reached, therapeutically, in sterility of this type, the desideratum is to determine which one of the trio is idle when an otherwise normal female does not conceive. In that event, the treatment of many a barren female would be a simple matter. Just when this will become *fait accompli* is problematical but the fact remains that scientific progress in that direction is being made.

The impression that gonad substance, ovarian or orchitic, stimulates the sex glands appears to be erroneous. It injures these glands and is contraindicated in sterility, one author declares. Obviously, the stimulation is at the wrong end of the chain in most instances. The trouble lies in the pituitary or thyroid or both, and as a consequence the attempted direct stimulation is harmful, or at least futile, unless the gonadotrophic principles of the pituitary and thyroid are ample.

The object of this brief discourse is to state frankly that while polyhormone or monohormone therapy is justified in sterility and spectacular effects are sometimes obtained, failures may be expected. Precision of dosage and repetition and in diagnosis are gaps yet to be filled.

A great live stock show will be held in connection with the West's World's Fair at San Francisco in 1939. Plans are already under way to bring exhibitors and animals from each of the eleven western states.

World's Dairy Congress

The 11th World's Dairy Congress will be held in Berlin, Germany, from August 21 to August 28, 1937, under the auspices of the International Dairy Federation, which was founded on the occasion of the first World's Dairy Congress at Brussels in 1903. Other dairy congresses had been held as follows: Paris, 1905; Hague, 1907; Budapest, 1909; Stockholm, 1911; Bern, 1914; Paris, 1926; London, 1928; Copenhagen, 1931; Rome and Milano, 1934. An international dairy congress took place in Washington-Syracuse in 1923.

The meeting will be in four sections. Among the papers by veterinarians in section 1, the following have been announced: F. Müssemeier, Berlin, Germany, "The control of bovine tuberculosis." S. V. Nyiredy, Magyarovar (Hungary) "The role of the whey in the spread of tuberculosis." W. Steck, Bern, Switzerland, "Recent investigations in the control of mastitis." M. Török, Magyarovar (Hungary) "The detection of mastitis milk." H. Bauer, Berlin, Germany, "The spread and control of abortus Bang." T. M. Doyle, London, England, "The eradication of bovine contagious abortion." Dr. Lerche, Berlin, Germany, "The demonstration of abortus Bang bacteria in the milk." B. Manninger, Budapest, Hungary, "Control of bovine brucellosis and prevention of its spread through the milk." A. Mirri, Palermo, Italy, "Geographical distribution of brucellosis; prevention and control of the disease." Roots, Tartu, Esthonia, "The control of brucellosis." A. Veenbas, Leeuwarden, Holland, "Control of abortus Bang."

In section 3, veterinarians have papers as follows: Dr. Gorini, Italy, "Measures for the sanitary production of milk." Dr. Beusch, Leipzig, Germany, "Measures for the promotion of milk hygiene and public health." N. Kjaergaard-Jensen, Hillderod, Denmark, "Various measures for the promotion of dairy sanitation in Denmark." P. Käppeli, Bern, Switzerland, "The control of chronic epizootics in Switzerland, a measure for the improvement of the hygienic quality of milk." J. Rudolph, Austria, "The production and control of certified milk in Austria." The total number of papers offered in the four sections is 448.

An international dairy exhibition will be held in connection with the congress. At the close of the meeting, trips will be made to large industrial dairy plants and to research institutes in various sections of Germany.

For further information, write to the Secretary General of the 11th World's Dairy Congress, Lindenstrasse 28, Berlin Sw 68, Germany.

May 10, 1936, there remained only 91 of the 3,071 counties in the United States that are not classified as modified tuberculosis accredited areas; that is, tuberculosis among cattle has been reduced to less than one-half of 1%. Of the remaining counties, 43 are located in California; 29 in South Dakota; 14 in New York; 4 in New Jersey and 1 in Maryland. Tuberculosis-eradication work is progressing favorably in nearly all of these counties.

J. H. Mercer, Live Stock Commissioner of Kansas for the past 28 years, died at his home in Topeka, May 5, 1937, after a brief illness. Mr. Mercer, in point of service, was the oldest state live stock sanitary official in the country, and was widely known among veterinarians.

Although he held a political office, changes in the state administration meant nothing to "Joe," because early in his political career he induced the Kansas legislature to enact a law in effect making him the only person eligible to the office of Live Stock Commissioner.

J. H. Mercer—1864-1937

The 47th annual meeting of the Veterinary Association of Manitoba was held in Winnipeg, February 12, 1937. There was a good attendance of members from all parts of the Province, as well as officials from the Provincial and Federal Departments of Agriculture.

Election of officers resulted in the selection of sulted in Dr. J. W. Fasken, Portage la Prairie, president; Dr. T. G. Sprague, Winnipeg, vice-president; Dr. Wm. Hilton, Winnipeg, secretary-treasurer and registrar; Dr. J. A. Martin, Sperling, Dr. A. Savage, Winnipeg, Dr. T. G. Sprague, Winnipeg, Dr. H. R. McEwen, Stonewall, Dr. J. W. Fasken, Portage la Prairie, Dr. Wm. Hilton, Winnipeg, Dr. J. K. Morrow, Winnipeg, as Members of Council; Dr. E. J. Rigby, Winnipeg and Dr. A. M. McFarlane, Winnipeg as auditors.

Examination for license to practice in Illinois will be held July 19th and 20, 1937 in Chicago. For application blanks and full information, write the Superintendent of Registration, Department of Registration and Education, Springfield. Applications should be filed 20 days before the date of the examination. The personnel of the Examining Board is: L. A. Merillat, Chicago, president; W. W. Warnock, Aledo and W. H. Shaw, Pawnee.

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James Howard Watson, Shawnee, Kas.
*Ben N. Winchester, Kinsley, Kas.

Those marked with an asterisk (*) were commissioned first lieutenants in the Army Veterinary Reserve.

Colorado Graduates

At the commencement exercises of Colorado State College, June 11, the degree of doctor of veterinary medicine was awarded to: Frank X.

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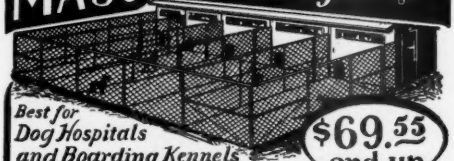

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BARGAIN IN BOOKS: Slightly damaged sets of Veterinary Military History of the United States, while the supply lasts, at $6.00 per set. Prepaid. The books are intact and in good condition. The damage is slight. Veterinary Magazine Corp., 1959 East 72nd Place, Chicago, Ill.

Gassner, Philip McClave, Jim C. McIntyre, Otto Montgomery, Fred Noah, Linn Poley, Jordan Rasmussen.

Scholarship honors for the class went to Frank Gassner. The commencement address was delivered by Dr. Thurston Davies, President of Colorado College.

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